The Builder.

VOL. LVIII. No. 2412. SATURDAY, FEBRUARY 8, 1890.

ILLUSTRATIONS.

Bronze Statue of Victory, in the Roman Museum at Brescia.—Drawn by Mr. Gerald C. Horsley ..... *Double-Page Photo-Litho.*

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R. Castell's Restoration, 1728; Bouchet's Restoration, 1852 ..... *Double-Page Ink-Photo.*

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On the Weathering of Oolite Building Stones.

BY far the greater number of the freestones used in building in the South and East of England are geologically known as oolites. Portland, Bath, Doulting, Chilmark, Minchinhampton, Ancaster, and Weldon, are amongst the principal stones included under this term. Everyone knows that the value of these materials in regard to their weather-resisting properties is not the same; that they are widely divergent in this respect. Some of the stones are softer than others, their grain and lie are different, and what may be suitable for some purposes may not be recommended for others,—they have specific uses. It is remarkable that so little attention has hitherto been paid by scientists to the causes of this variation in weathering, and it is yet more surprising that educated people who deal with this class of freestone every day of their lives in their business avocations should understand so little concerning the properties of the material. They know by repute that one stone is better than another, though they would in many cases not be able to make the differentiation were the blocks of each kind placed before them for selection. A certain stone may be specified for a building, but many amongst us could not say, definitely, from an inspection of the stone itself brought on to the work, whether this was what was ordered or not. From our faith in those who have executed the order for us we have often every reason to believe that the material supplied is that which was specified, but is it not advisable to be more independent in the matter? It is not a difficult thing to learn the peculiarities of, say, a dozen of the leading oolites in the market, but they must be carefully and minutely studied in the first instance.

An oolite is a limestone differing from all other calcareous building-stones in that it is largely made up (sometimes entirely) of small shot-like granules, often bound together with a cementing material. This congregation of granules imparts to the stone the appearance of the roe of a fish, hence the name oolite (Gr. *oon*, egg; *lithos*, stone). Oolites differ from each other in the size and abundance of the granules, the nature of the cementing material, and the presence of more or less foreign matter, such as shells, grains of sand, &c., intercalated amongst and bound together with the granules. They may also be distinguished, in some cases with comparative ease, by difference in tint, though when spread over a wide geographical area this character is of no importance. It should be distinctly remembered that these peculiarities are not necessarily confined to any one district, or even to one quarry. That is to say, we do not find that a peculiar class of structure is indigenous to a definite area, but, on the contrary, we may, and do, get four or five entirely distinct kinds of structure in the oolite from one quarry. But in the vast majority of instances these different appearances occur along separate horizons,—each horizon presents some readily distinguishable feature, known perfectly well to the quarrymen. Where all the kinds of stone from a quarry are, to the superficial eye, of distinct tint or grain, the outsider has no difficulty in seeing that the stone specified is that actually sent on the building; but where (as is often the case) the quarry presents two stones having a general resemblance to each other, they may not be distinguishable except to the trained eye, and the difficulty of seeing that the specification has been adhered to proportionately increases. Outward appearances of stone are very deceptive. A stone derives a certain amount of local repute from its having weathered well in old buildings, and rightly so; but it by no means follows that because a somewhat similar material is found in the vicinity that it will weather as well, though this is the kind of conviction that is largely traded upon. Two oolites having the same general appearance may weather very differently from each other, one being good stone and the other bad, the cause of which will presently be explained.

If we take any horizon in a quarry, as defined by jointing, and examine the stone at intervals along the bed, we shall find that, except in a few notorious instances, it very seldom varies in structure or quality for short distances; but, when that same horizon is traced into another quarry a few hundred yards off, or even in the same quarry where the workings run underground for long distances, the character of the stone often varies, it may be slightly, yet quite enough to alter a good horizon into a bad one. Conversely, a horizon that may give a bad stone in one quarry may improve in quality as it is traced a short distance away into another. We mention these facts to show how fallacious it often is to specify a stone bearing a good name, and found along a definite horizon, unless the quarry from which it is to come is also mentioned; and, likewise, how absurd it is to depreciate the value of the material solely because stone of the same name has proved to weather indifferently. The bad stone may have come from a point three miles off from where the stone bearing the same name is of excellent quality. The circumstance is not always appreciated, and it serves to explain many apparent anomalies in regard to the weathering of oolites.

Let us now examine the mode of weathering more minutely. In all works treating of the disintegration of stone, we find that great stress is laid on chemical composition; it is a fundamental axiom that stones largely made up of certain mineral matter of known chemical composition are proportionately attacked by atmospheric agencies. If the chemical composition in the aggregate is such that, theoretically, it is capable of being readily disintegrated, the stone is judged from that standpoint. This is why we find, in the elaborate treatises referred to, that attention is first paid to chemical analysis of the material. Stone merchants and quarry-owners are usually careful to circulate the results of a chemical examination of their stone, and we have often wondered whether they know what it really means, and whether the recipients of the circulars are any the wiser after reading them. Once we put the question to a well-known quarry-owner as to why he had had his material chemically analysed, and his reply was that "It was the proper thing to do." Another answered that, "By means of the chemical analysis we are enabled to tell how the stone will resist the action of the weather." Pressed as to how he would, within reason, judge of the analysis in this respect, he said that "He himself did not sufficiently understand the subject"; and this we find is the refuge behind which most people take their stand. The fact is that the value of chemical analyses in regard to estimating the weathering qualities of stones, and particularly oolites, has been very much overrated. We do not deny that in a general sense this analysis is good; it might be useful, for instance, in assisting us to distinguish a limestone from a magnesian limestone, or from a close-grained sandstone. In other words, it is useful in differentiating

rocks of extreme character. But when we come to consider any particular section of building-stones, such as the oolite freestones now under discussion, the value of a chemical analysis is reduced to a minimum. Oolite after oolite may be subjected to the chemist, and, within very circumscribed limits, the result in each case is about the same: we get a large proportion of carbonate of lime, a little carbonate of magnesia, iron, alumina, silica, &c. Two stones may show an almost identical chemical composition, and yet one is known by experience to weather well and the other badly. Where, then, does the use of the chemical analysis come in? Clearly in a case like this it is of no practical value whatever. But this is not all. We should not mind so much if the results of the chemical analysis were only negative in character; when, however, we come to learn that in certain cases they are so very misleading as to result in an altogether incorrect idea of the value of the materials to which they refer, and especially when we know that the erroneous impressions are being traded upon, we can hardly refrain from inquiring further into the matter.

We give a few published analyses of well-known oolite building-stones by way of illustration:—

Chemical Analyses of Oolites.

	Bath Box.	Portland.	Chilmark.	Doulting.	Ancaster.	Barnack Mill	Ketton.
Carbonate of lime	94·52	95·16	79·0	95·89	93·50	93·4	92·17
Carbonate of magnesia	2·50	1·20	3·7	0·11	2·90	3·8	4·10
Silica	..	1·20	10·4	2·04	..	..	..
Iron	1·20	0·50	2·0	0·85	0·80	1·3	0·90
Alumina				0·79			
Water	1·78	1·94	4·2	0·32	2·71	1·5	2·83
Loss				..			
Bitumen	trace	..	..	..	trace	trace	trace

We will now endeavour to trace the connexion between denuding agents and the weathering of oolites from a chemical point of view. It will be noticed in the above table that carbonate of lime is the main constituent of each rock mentioned, and there can be no doubt that this is the mineral chiefly attacked in the process of disintegration, and the great chemical disintegrator is rain. Carbonate of lime is insoluble in water, but as rain contains a certain proportion of carbonic acid, the carbonate of lime is reduced by this acid to a bi-carbonate, which is soluble, and in the end the surface of the stone is dissolved, and washed away, and each successive surface is treated in a similar manner. *Cæteris paribus*, it would appear that the stone containing the highest percentage of carbonate of lime is the worst in quality; yet this is not necessarily so,—it is not even the rule. Anyone who understands the relative qualities of the stones mentioned in the table, will see what we mean. The chemical analysis of chalk is practically identical with that of pure statuary marble, both being wholly composed of carbonate of lime, but everybody would admit the absurdity of suggesting that the former substance is as durable as the latter. Why not, if the percentage of carbonate of lime present has anything to do with it?

The same remarks apply to the carbonate of magnesia. Again, we hear on all sides that it is desirable for an oolite to possess a great proportion of silica, on the ground that silica is to all intents and purposes an insoluble mineral. But we submit that a chemical analysis is wholly incapable of determining the question as to whether an oolite possessing a high percentage of silica is the more durable or not. Suppose (as we know is frequently the case) the silica is present only in the form of grains of sand interspersed amongst the oolite granules, in what way can its presence render the stone more durable as a whole? On the stone being attacked by carbonic, hydrochloric, sulphuric, or other acid in the atmosphere, the grain of sand would simply be weathered out and fall away,—it would lend no support to the material. Then, again, the presence of iron might be thought to be deleterious to preservation, and so it is in anything like large quantities; but its presence in oolite building stone is manifested by the colour of the rock, for the cream and blue tints are mainly due to iron; so that the presence of the mineral can be foretold merely by an appeal to common knowledge, and without an analysis. Iron does not enter so materially into the composition of the stones under consideration as to affect their weathering properties to an appreciable extent, though in certain oolites not used as building stones that mineral is sufficiently abundant to afford an excellent iron ore. In certain stones iron occurs as pyrites.

Alumina is clayey matter found but sparsely in good oolites, and does not affect our chief arguments.

Seeing, then, that an ordinary chemical analysis is of so little use in enabling us to determine the durability of oolite, we may inquire whether any other and better method is known. Considerable light may be thrown on the subject by studying the origin and structure of the stone. It has hitherto been customary for so-called "practical" people to altogether ignore the origin of different kinds of building stone, on the ground that it has no direct bearing on the practical side of the question, it being merely of philosophical interest. But this is not so. We do not for a moment contend that it is necessary for practical purposes to enter into the intricacies of the divers hypotheses concerning the origin of all known kinds of stone,—that would be absurd. What we do say is that by gaining some idea of the main facts concerning "origin," the *raison d'être* of the all-important factor in building-stone selection,—structure,—is intuitively learnt also. To no class of stone does this more closely apply than to that now under review. Before explaining what is known concerning the origin of oolite, however, we must know something of its structure. This is best studied by examining very thin, transparent sections of the stone under the microscope. We shall then see (in a typical representative of the group) that the small granules alluded to in the earlier part of this article usually exhibit the following structure:—In the centre of the majority of the granules we observe a minute grain of sand, shell, or other fragment which serves as a nucleus around which successive layers of carbonate of lime occur, not unlike the coatings of an onion. Occasionally the centre is a hollow cavity, produced, probably, by the dissolution of what was once there. From the centre to the circumference, exceedingly minute lines or cracks radiate. The stone is made up of myriads of these granules, which sometimes adhere to each other without having much cementing material between, but more often are joined together by a considerable amount of mineral matter. In some of the Lincolnshire oolites, the granules are relatively far apart, and do not form more than half the bulk of the stone, the spaces between being filled in with natural cement, of which more anon. Except in rare instances, however, we shall observe that large shells and other fossils are present, imbedded in the cementing material between the grains, and it may be that the granules are cemented closely to the shells.

Fossil shells enter largely into the composition of Portland, Bath, and nearly all the best-known oolites. The shells are of marine origin; and it is quite clear, therefore, that the stone itself was originally formed in the sea. It has been shown that, at the present day, granules of similar structure to those of oolite are forming near the coral reefs of the Bahamas, and off the coast of Jamaica; and it would appear that the granules are made by particles of sand, or other objects, being kept in motion in water highly charged with carbonate of lime, which latter is deposited and encrusts the particles, so that they eventually become enveloped by successive coats of the mineral. Oolitic grains of this character are also being formed in the springs of Carlsbad (Sprudelstein). At the same time, whilst it may be admitted that oolitic structure in general has been produced in this manner, we have unequivocal proof that it has also occasionally been formed in the stone subsequent to its deposition. Quite recently, again, it has been shown that in certain oolitic stones of very coarse grain (pisolites) the spherules are of entirely different origin. Mr. E. Wethered, F.G.S., has discovered* that in these cases the nuclei are enveloped by minute tubes of peculiar organisms; and two months since he further described them before a meeting of the Geological Society. On that occasion, also, Professor Judd, F.R.S., stated† that he had examined some recently-formed oolitic grains, and that the structure of some of them was very similar to the tubuliform pisolite referred to. So much for the origin of the granules.

We now approach the most important part of the structure of oolite,—the nature of the mineral matter which cements the granules and shells together. It will be obvious that the rate of weathering of the stone is almost entirely dependent on the character of this cement, for assuming it did not exist, we should merely have a deposit of loose material like sand, instead of a stone. There is every gradation of compactness, from an incipient substance in which the grains are only just held together, up to a rock so hard and close as to be difficult to tool. As we have before stated, the chemical composition of these two kinds of oolite,—the soft and the hard,—is often identical. What greater proof is needed of the futility of an aggregate chemical analysis in showing the weathering properties of the stone? Further, suppose every space between the granules has been filled up with what we know to be carbonate of lime, *per se* this is no guarantee that the stone will weather any the better for it. When carbonate of lime is amorphous (having no crystalline form) it is readily washed out of the stone by the action of rain, and so the fabric decays; but when the lime is crystalline, having taken on the form of calcite, it resists the weather for a very much longer period, and the oolite is better in quality. It depends whether the cement is crystalline or not.

Now we have to consider the structure of the shelly matter found in the stone. In the first place it is necessary to explain that, generally, the original shells have disappeared long ago. They have been dissolved out of the rock by the action of percolating water containing acid, and the cavities thus formed have been refilled by other mineral matter,—mostly carbonate of lime,—deposited from solution, and this secondary mineral has nearly always taken on a crystalline form. But here, again, we have to pause in considering that carbonate of lime crystallises in two different ways, producing two distinct minerals, calcite and arragonite, the former being much more durable than the latter. From the fact that arragonite is harder and heavier than calcite, it might be supposed that the reverse would be the case. It is another proof that the hardest minerals are not always the most durable. In examining stone in buildings erected only a few years since, we often find the surface pitted with holes and cavities, &c., which are mainly the result of the weathering out of arragonite shells. Where the oolite is largely made of such shells, it becomes a serious matter, for the whole substance gradually wastes away.

It may be asked, seeing that calcite and arragonite are of identical composition, How can they be differentiated? This is done by the aid of the microscope and polariscope, the optical characters of the two minerals being very distinctive. There can be no question that a microscopic examination is the best available method of determining the relative durability of oolites. By it we can arrive at the whole structure of the stone, the state of crystallisation of the component minerals, and the nature and disposition of the foreign frag-

* "Geological Magazine," N.S., Dec. 3, vol. vi. (1889) p. 196.
† "Abstracts Proc. Geol. Soc.," Dec. 18, 1889, p. 25.

ments which so frequently prejudice the chemical analytical method. If the material contains an abnormal quantity of silica it is only by an appeal to the microscope that we can say whether that durable mineral, in a particular case, adds to the strength of the stone by entering into its constructive framework, or is merely present as the nuclei of granules. Microscopic analysis must, therefore, become the method of the future.

So far, we have only discussed the weathering of oolites from chemical and mineralogical points of view. Like other stones, they are disintegrated to a certain extent by the action of frost and wind; and in this connexion it is important to know how much water they absorb. The position in which they are built with reference to the rainfall of the district is also an important factor. But these things are now tolerably well known,—they refer to all kinds of stone alike,—and their consideration does not fall within the province of the present article.

We may take this opportunity, however, of correcting a rather popular error in regard to the method of placing laminated stones in buildings in course of erection. It is everywhere understood that it is the correct thing to lay the stones so that the bedding is horizontal, and specifications frequently insist on this point. This is because of the well-known fact that laminated stone built exteriorly, with the bedding planes parallel to the face of the building, weather by flaking off, coat after coat being removed, whereas when the bedding planes are horizontal, the stone cannot flake in this manner. This is quite right, but laminated stones could also be safely built with the bedding-planes vertically disposed "end on," and suffer none the more for it, providing they are not placed at corners. Such, in fact, should be the proper positions of the key-stones of arches subjected to great stress.

The vexed question as to when it is advisable to clean down freestone buildings is more intimately connected with oolite than with any other class of stone. It is known that Bath and other similar limestone chemically forms a hard crust on exposure to the atmosphere for lengthened periods, and that this crust acts as a protection to the rest of the material. It is equally clear that if this hardened surface is cleaned off that it does not re-form so perfectly as before, and that the stone, consequently, is more easily weathered. This being so, the question arises whether it is advisable to clean down a building during process of erection, or subsequently; or whether the stone to be used should be seasoned or otherwise. We think that this depends very largely on the length of time to which the actual face finally to be left has been exposed to the atmosphere since it was quarried. The protective crust is derived from a slight decomposition or alteration taking place uniformly within about the depth of an inch or so of the exposed part of the stone. If the material is first seasoned at the quarry, and the seasoned surface is subsequently left in the building in an exposed position, any attempt at cleaning down will assist the disintegration of the stone; but if the latter is seasoned at the quarry, and the outside inch or two is tooled off on its being built up, the stone may be cleaned down during erection, as another hard surface will form, though, as far as our observations go, it is not quite as perfect as it might be. Under other conditions it is often advisable to use unseasoned stone after the moisture has fairly dried out. It is certainly not desirable to scrape down old buildings of oolite, as the weathering of the stone is much facilitated thereby.

London Geological Field Class.—A course of four lectures will be delivered by Prof. H. G. Seeley, F.R.S., on February 15 and the three following Saturday afternoons, at four o'clock, by the kind permission of the Gresham Committee, at the Gresham College, Basinghall-street. Subject: "The Tertiary rocks on which London stands."

NOTES.

THE Railway Rates Inquiry has now entered upon its second phase, Mr. Balfour Browne having opened the case for the traders in a speech of four days' duration. The efforts of the learned counsel were mainly directed to demolishing the statements and figures put in by the railway companies,—indeed, he asked the Court to disregard the whole of them as absolutely worthless. Seeing that the London and North-Western Company alone have spent 10,000*l.* in the preparation of these figures, this seems rather too much to ask; in fact, Mr. Balfour Browne proceeded to deal with them for what he considered them to be worth, being quite disposed, apparently, to adopt certain of them which bore out his own views. He maintains that Parliament never said that the traders were to be constructive in the making of schedules and classifications, but that the constructive work was to be done by the Board of Trade if they could not agree with the proposals of the railway companies. His principal objection to the proposed maximum rates is that they are based upon existing powers, instead of actual rates; and the evidence of his witnesses will probably be directed to this latter point, as the railway companies have avoided it. By the by, it is proposed to call no fewer than 136 witnesses on behalf of the Mansion House Committee alone, but endeavours will doubtless be made to dispense with some of the number. As to classification, Mr. Balfour Browne acknowledges that if that compiled by the Railway Clearing House were honestly made the basis of the new one, the traders would have no great cause to complain. The recent conferences have resulted in the departures from this classification being so reduced in number that we think this condition may be looked upon as complied with,—the remaining points of difference being still left open to discussion. Having regard to the inevitable authorisation of "terminals" in some shape or another, Mr. Balfour Browne makes a very practical suggestion. He said that the evidence showed that even in the case of an important firm like Huntley & Palmer, although they have their own siding and do their own work, the rates charged to them are precisely the same as those charged to other traders at Reading. He asks the Court to fix maximum charges for every terminal service, separately, and to give the trader a rebate where the services are not performed. Of course there are difficulties in the way, as the Court is dependent upon the railway companies for evidence as to the cost of all these various services; and seeing that there are a host of objections raised against such figures of this nature as have already been submitted, it would no doubt be very difficult to arrive at a satisfactory understanding as to the reasonableness of the amounts for which they would ask Parliamentary sanction.

IN regard to the possible new offices for the London County Council, a correspondent (a London architect) writes:—"It is no secret that the City authorities are most anxious to thrust on the Council a piece of land facing the Embankment, near Blackfriars. I would beg of you to consider the advisability of suggesting,—amongst other sites that I daresay will occur to you,—the identical site of Whitehall Palace, where proposed to be placed by Inigo Jones. One advantage, possibly, would be that this site is already covered with one building which might be suitable,—viz., a Banqueting Hall. Besides this building the site is occupied with the statue of James II., the office of the Board of Trade (which wants re-building), and about a dozen private houses. I believe all the land is Crown property, so that compensation for disturbances could not be serious, and there would be no hurry to pull down the existing buildings. It is possible the site is not well known to many among your readers; I would explain, therefore, that I mean that if the road at present leading from the east side of Whitehall to Whitehall-gardens, along the north side of the Duke of Buccleuch's, were continued right through to the Embankment, and if the road, or rather the "Slough of Despond," at the north side of the Banqueting House, were also continued right through to the Embankment, a grand rectangular site would be obtained, with a long frontage to new streets on the north and south, a long frontage to the widest part of Whitehall on the west, and the same length of frontage to the Embankment on the east. I need hardly point out what a grand addition to the Embankment such offices might be, or how centrally situated amongst Parliamentary, Police, and Home Offices is such a site."

THE death of Dr. Salviati is announced, at the age of seventy-four. His name has been to a great extent identified in Venice and in England with the revival of the art of mosaic and of the Venetian artistic glass industry. He was not himself an artist or designer, and his efforts in setting up again these two artistic crafts on their old ground seem to have been prompted a good deal by patriotic feeling, coupled with that kind of insight which enables the possessor of it to foresee a probable demand and provide for it. In as far as the Murano glass manufacture was concerned, it was carried on in too archæological a spirit, even to the conscious production of irregularities and crookednesses of make; a kind of thing which took the public when it was novel, but which the best artists saw through and on occasion denounced. In regard to this kind of effort the Murano glass work has had its day of fashion, and capricious modern taste is getting tired of it, as is pretty sure to be the case with all art work which is a revival of old fashions for the sake of revival; but there is no doubt that incidentally it gave an impulse to the long-forgotten idea that table glass was a thing capable of beautiful artistic design and expression, and not merely a utilitarian class of goods for practical use; and most of the other efforts at giving artistic form and spirit to glass utensils have been at all events stimulated by the example of Salviati's enterprise or the desire to rival it. In regard to mosaic, the position taken by Salviati and his coadjutors is more stable. They provided for the manufacture of the material and the proper carrying out of the process of fixing; and though a good deal of too archaic work was done by them for church architects in the high tide of the Gothic movement, the more rational artistic use of the material by designers has now brought mosaic decoration into higher repute, and the gratitude of the artistic world is equally due to the man who recalled and revived the use of such a splendid medium for architectural decoration.

MR. ROBINS'S paper on "The Relation of the Fine Arts to the Applied Arts," recently read at the Society of Arts, and published in the last issue of the Society's *Journal*, had for its main object the suggestion that technical schools should include art-teaching in their curriculum, instead of leaving those who receive instruction in technical processes of manufacture to learn elsewhere how to apply design in these processes, or to leave that little matter altogether unlearned. Mr. Robins said:—

"At the Central Institution no such art teaching has been commenced, although that was the first intention, and a portion of the building was set apart for the fine arts, which has since been devoted to science-teaching purposes, and no professors of the fine arts have as yet been appointed.

This branch, however, is never found wanting in foreign polytechnics, which are not considered complete without their art side,—with its staff of professors of architecture and construction and painting and sculpture. The Professor of Architecture at Carlsruhe was the architect of the new Strasburg University, which has cost half a million of money. In this particular, therefore, the Central Institution in its present development cannot compare with foreign polytechnics, being almost exclusively devoted to the applied sciences; and my regret that this should be the case has had its influence in determining the subject of this paper.

During the delivery of Mr. Alan Cole's in-

teresting paper on Irish Lace Industries last Session, a striking example was given of the importance of maintaining a close alliance between the fine arts and the applied arts. The paper was illustrated by enlarged photographs of original laces, contrasting designs made before and after art lessons had been introduced into that country, and showing the waste of energy which had long been expended in bad designs, wherein the workmanship was beautiful, but the value was deteriorated by reason of the lack of taste in the design, and the absence of fine art culture observable in its general arrangement and ornamental detail."

In the course of his paper Mr. Robins frequently quoted from the volume of papers read at the Liverpool Art Congress, which, as he truly said, formed too valuable a *résumé* of opinions and suggestions upon art to be left buried in the recesses of libraries.

THE London County Council, at their meeting on Tuesday last, as reported in another column, received with much surprise, and many expressions of regret, the intimation from Sir John Lubbock, the Vice-Chairman, that Mr. Clement Dunscombe, late of Liverpool, who was elected to the post of Chief Engineer of the Council so recently as December 3 last, in succession to the late Mr. Gordon, had written tendering his resignation, on the ground of ill-health. We are very sorry indeed to hear of this. As was recently mentioned in our columns, Mr. Dunscombe, on leaving his duties as City Engineer of Liverpool, went for a sea voyage as far as the Canary Islands, preparatory to entering upon his duties in London. The London County Council and the inhabitants of London are to be condoled with on the loss, within so very short a period, of the services of two gentlemen who stood in the very front rank of municipal engineers. Mr. Gordon's very sudden death on November 9 last, after only about two months' tenure of office, will be fresh in the recollection of our readers; and now his successor, Mr. Dunscombe, has felt compelled to tender his resignation owing to ill-health, just as he was about to enter upon the important duties of the office to which he had been elected. We had hoped much for Londoners from the professional ability first of Mr. Gordon and then of Mr. Dunscombe. The London County Council have decided to fill up the vacancy as soon as possible. We trust that they will secure a capable man, and one whose tenure of the post of Chief Engineer will be very much longer than that of his predecessors. In the meantime, the Council appear to us to have made a very good appointment in electing Mr. W. Santo Crimp (Engineer to the Wimbledon Local Board) as Assistant-Engineer, in the room of Mr. Thomas Lovick, who is about to retire after a long period of service under Sir Joseph Bazalgette.

DR. CHARLES WALDSTEIN, the Director of the American School of Classical Studies at Athens, gave his inaugural address for the present session in the School Library, on Monday, January 27. Dr. Waldstein, who holds the appointment of Reader in Classical Archæology at Cambridge, has recently resigned the Curatorship of the Fitzwilliam Museum there, in order to devote more time to the furtherance of the objects of the American School. He will reside in Greece each session from Christmas till Easter, and during this time, in addition to directing the general work of the School and any excavations that it may have in progress, he will give a series of lectures to students, both in the School and at the museums, on various archæological subjects. This year he is devoting his attention to sculpture, while Mr. Gardner, the Director of our British School, has taken up vases and topography, the two Directors being particularly anxious that the English-speaking schools should combine and work together as much as possible in this way. In addition to their permanent Director, the Committee of Management in America, which is composed of representatives from the principal American colleges, appoint annually a second director, generally one of their professors of Greek, who more particularly undertakes the superintendence of the students' work in the classical languages and literature, the American school differing from ours in being a school of classical studies as well as of archæology. Dr. Waldstein began his address by speaking of the increased facilities now offered to students in the museums of Athens, and in Greece generally, owing to the enlightened zeal and energy of the General Ephor of antiquities, Dr. Kabbadias, who is busily arranging the vast quantities of materials of all kinds, the products of the various diggings which are constantly being carried on by the Government, the Greek Archæological Society, and the various foreign schools. He insisted on the necessity for the formation in Athens of a vast museum of casts embracing the whole range of Greek sculpture, and he appealed to the patriotism of the wealthier Greeks, who have already done so much for the Athens of to-day, to make this want a reality.

REFERRING to the water-supply of St. Petersburg, a correspondent states that it is still very defective. The water is obtained from the Neva, and last autumn, for the first time, a certain system of filtration was introduced, but has failed to improve the condition of the water, as it is rendered impure in filthy cisterns on the roofs of the houses, into which dangerous rubbish is often thrown. In consequence, the hygienic state of the Russian capital is very bad; and in December last, the rate of mortality rose to double that of London. Proposals, however, have been made to the City authorities for erecting modern water-works, the proposal being to obtain the water from a couple of lakes some distance from St. Petersburg.

A GENOA journal draws attention to the increasing erection of timber dwellings in Northern Italy since the earthquakes in 1887. As is well known, the latter are far safer than stone houses in this respect. However, the opinion is expressed that along the Riviera these houses cannot pay, on account of the great expenses attending the excavation of the rocky ground. For instance, in Genoa, houses have to be run up eight or ten stories, in order to yield a return upon the capital invested. It is also doubted whether timber will be able to withstand the great summer heat prevailing in the Mediterranean and keep free from rot. As to the reputed greater coolness in summer of wooden houses, the journal in question points out that no houses can be cooler than the thick-walled stone buildings of Italy, Spain, &c.

A REPORT by Dr. Parsons to the Local Government Board (dated December 21, 1889) on certain outbreaks of diphtheria in the Leek Rural Sanitary District, Staffordshire, gives, among others, the following particulars as to the sanitary state of some of the houses in which the disease appeared. In one case,—

"The sanitary state of the house is very imperfect. The whole family sleep in a single bedroom of about 950 cubic feet capacity. There is another small bedroom, but it is not used, as it is dark and unventilated, having only a single small window which will not open. The privy is close to the pantry-window, and the smell from it is complained of. Drainage is into a cesspool; the drain has an untrapped inlet out of doors, but close to the house. (Both the untrapped inlet and the fixed window, it is right to say, were put in by the tenant himself, who is a mason by trade.)"

Of another case we read:—

"The house, like most of the cottages in the district, has windows in the front only, and the window of the downstairs room does not open. There are two bedrooms. The back wall is partly below the level of the ground. There is no drain, slops being thrown over a low wall on the farther side of the footpath in front of the house. For the four houses there are two privies, which are at the upper end of the row; they are low and dilapidated, with wet cess-pits, of which the contents ooze out on the surface of the ground."

Another infected house is described as follows:—

"The house stands by itself among fields; the surroundings are uncleanly. The drain is a rough stone sough, the flat bottom of which is covered 3 in. deep with black stinking sediment. It is in direct untrapped communication with the interior of the house, and ends in a field, with an open mouth, so that when the wind is in that direction all the foul air generated in the drain must be blown up into the house. The privy, with a wet, open pit, is built against the end of the house; the wall of the living room at that point is saturated with damp, and a bad smell is complained of as being perceived in the house. Fowls are kept in a dirty state in a shed abutting against the back of the house, and water from an old land drain, which is blocked sometimes, wells up into the pantry."

In regard to general considerations as to the sanitary state of the district, Dr. Parsons says:—

"A primary duty of a sanitary authority, which requires more attention than it receives in this district, is the remedying of unwholesome conditions of houses and their surroundings. It will be seen from the foregoing pages that at all the houses where diphtheria had occurred gross and dangerous nuisances were found to exist, such as a damp, dilapidated, and ill-ventilated condition of the house; defective drains, some in direct connexion with the interior of the house; faultily-placed privies; and water supplies exposed to contamination; and though there is no sufficient ground for ascribing the origin of the diphtheria solely to such defects, it is likely enough that they assisted its spread and aggravated its severity. Yet (with the single exception of Horton Vicarage, where efficient works had been spontaneously carried out by the vicar) I found that these conditions had remained entirely unremedied or without any effectual remedy up to the time of my visit. In some cases they had been unobserved; in others notices had been served, but not complied with; and in others again trivial works had been done, which were insufficient for their purpose. In the latter cases, the failure to secure the effectual carrying out of the required works appeared to be the result of the view locally taken of the legal powers of the Authority—a view which I understand has been superseded by recent legal decisions—viz., that the Authority have only power to order the abatement of a nuisance, and must not specify in their notice the particular works required to be executed for the purpose. However this may be, having regard to the prevalent want of sanitary knowledge, the difficulty of getting country workmen to carry out works in any way but that to which they have been accustomed, and the hardships felt by owners when works which they have had carried out to the best of their knowledge and ability are not found satisfactory, it seems desirable, in the interests of owners themselves as well as of the public health, that when they are called upon to execute structural works for the abatement of nuisances, they should be told what the required works are, and the best way (which is by no means necessarily the most expensive one) of carrying them out."

BY direction under the will of the late Lord Falmouth, who died on Nov. 6 last, his town house, in St. James's-square, together with his property at Newmarket, is to be sold. The house, No. 2, on the eastern side, has long been distinguished by a row of posts, which are ship's cannon. These were taken by Admiral Edward Boscawen, son of Hugh, first Viscount Falmouth, and ancestor of the first and second Earls of that title, at the capture of the French fleet by Anson, off Cape Finisterre, on May 3, 1747. It was about this time that Savage and Dr. Johnson, having no resting-place, spent a summer's night in walking round the square, resolute "to stand by their country." A print of 1773 shows the rows of ordinary posts around the pavement, the octagonal enclosure having obelisks and lamps at its angles, and the central oval-shaped pond, with a fountain, where Bacon's statue of William III. was afterwards set up. In the Parish Clerks' "New Remarks of London," 1732, it is stated that the pedestal for the statue was already there, and that the enclosure "was done at the Expence of the Nobility and Gentry inhabiting the *East*, *West*, and *North* sides of the square, who obtained an Act of Parliament for the performance thereof." This was the pond into which the "No Popery" rioters threw the keys of Newgate Gaol in 1780; and there they were found many years later.

BY the incorporation of Paul's Chain and Godliman-street with the existing thoroughfare of Bennet's-hill, two old landmarks will disappear from the maps of London. A court in Godliman-street still commemorates the name and situation of the

baking-house for the supply of bread to the Church of St. Paul, latterly the Admiralty Registry. By Paul's Chain—the "south chain of Paul's," mentioned by Stow—we are reminded of the old practice of stopping traffic around this side of the Cathedral during the hours of service therein. The whole of its eastern side is now in course of demolition. Godliman-street also lay within St. Gregory's parish. The derivation of its name appears to be uncertainly known. Some regard it as a corruption of Godalming, or Godalmin, street: early in the last century it was styled Godly-man-street. No less an authority than Edward Cocker once lived on the southern side of the church, over against Paul's Chain, and there in 1660 he wrote his masterpiece of caligraphy, "The Pen's Transcendancy." He was buried in the former church of St. George the Martyr, Southwark, *teste* Hatton, who was so told by the sexton.

IN the very interesting "Early Diary of Fanny Burney," just published, is a reference to Robert Adam, the eminent architect, which places him in a very agreeable light in his social character. Miss Burney, then seventeen, first recalls meeting Robert and James Adam at a dance at her friend Mrs. Debieg's; like many writers of the present day, even professed writers on architecture, she makes the mistake of writing the surname "Adams" instead of Adam (though this is corrected in a subsequent chapter of the diary). "Mr. Adams, very sensible, very polite, very agreeable,—the most so, Mr. Debieg excepted, of the whole party. Mr. —— Adams, his younger brother, a well-behaved good sort of young man." Another passage later on shows that Robert and James were the two special brothers present on this occasion; and this rather melancholy praise of James, the younger, as "a good sort of young man," confirms the opinion we recently expressed, in reviewing Mr. Brydall's book on Art in Scotland, that Robert was in every way the master personality in the family. But as Fanny's reminiscences of the evening proceed, her recollections of Robert Adam grow still more pleasing: in the quotation we give Adam his proper surname, which Miss Burney did not get right till a year or two later in her diary, though her reference there leaves no doubt of the identity of the man:

"We then left off for supper. During the time of rest, I was happier than in dancing, for I was . . . .* more pleased with the conversations I then had with Mr. Dundas, Mr. Adam, and others, than with my partners, and they all in turn came to chat with me, with as much good humour as if I had been as good a talker as I am a listener. Mr. Dundas the elder and Mr. Adam are quite high conversers. I was never more pleased. . . . .

When supper was over, all who had voices worth hearing were made to sing,—none shone more than Mr. Adam; though in truth he had little or no voice . . . yet he sung with so much taste and feeling that few very *fine* voices could give equal pleasure: I cannot but much regret the probability there is of my never seeing him again. I may see many fools ere I see such a sensible man again."

On the matter of Mr. Adam's taste in singing the opinion of Dr. Burney's daughter, who lived in the midst of music and musicians, was of course a sound one; and no one who reads her diary will doubt that she was an equally good judge of personal charm of manner and conversation. It might have pleased Robert Adam as much as his architectural success, to have known that a century later his name would be found recorded in the diary of one of the most lively and attractive young girls of her day, as the most pleasant and accomplished man she had met in society.

Bridge Across the Bosphorus. — The Constantinople journal *Hakikat* states that a syndicate of French capitalists has obtained a concession for the construction of a bridge across the Bosphorus in the narrowest part, between Rumeli and Anadoli-Hissar. It is to have a length of 800 mètres, with a height above the water level of 80 mètres.

* The break here is in the Diary.

LETTER FROM PARIS.*

THE conflict which has arisen in the ranks of the Société des Artistes Français, referred to in our last,† far from having subsided, has assumed such proportions that the rupture between the two parties in that body is now complete, and this year we shall have, along with the old Salon exhibition of the Palais d'Industrie, a rival exhibition organised under the auspices of the new association, which will bear the title of "Société Nationale des Beaux-Arts."

Laudable efforts were no doubt made to prevent this ill-advised schism. On the part of the old Société, MM. Guillaume, Bonnat, and Chas. Garnier have vainly attempted an overture of conciliation, which was refused categorically by M. Meissonier, who is supported in his position by numerous adherents. A committee, including MM. Puvis de Chavannes, Carolus Duran, Roll, Gervex, Galland, Cazin, and Bracquemond, has drawn up the statutes of the new society, which will be composed of "Membres Fondateurs," "Membres Sociétaires," and "Membres Associés." The "Sociétaires" will be artists, either French or foreign, who shall give their adherence to the statutes of the Society on the invitation of the Membres Fondateurs. The Associés will be artists whose works have been admitted into the exhibitions of the Society, and who will have been adjudged worthy of the title at a general assembly of the Sociétaires. Associés can become Sociétaires by the vote of the general assembly. The number of Sociétaires and Associés is not limited.

The title of "Membre d'Honneur" or "Membre Adhérent" can be conferred by the Sociétaires on persons who have rendered services to art or to the Society, but these titles will not confer any right to take part in the deliberations of the Society.

The funds of the Society will be devoted to the establishment of annual exhibitions, and to the expenditure arising therefrom. The surplus revenue will be devoted to the purchase of works of art, which may be offered to the State museums, to the formation of a reserve fund, &c.

The administration of the new Society will be confided to a delegated Council of Membres Fondateurs, Sociétaires, or Associés. Such are the general terms of the constitution of the new Société Nationale, which will distribute no medals or rewards. Members will not be limited as to the number of works they may exhibit, but they will, on the other hand, be formally interdicted from exhibiting at the old Salon. The "Salon Nationale" will open every year on the 15th of May, fifteen days after the other Salon, an arrangement which will at all events render matters easier for the art-critics. It will last a month, and will be held, pretty certainly, in the Palais des Beaux-Arts at the Champ-de-Mars; the building has not been either offered or asked for as yet, but there is no doubt the Government will give the use of it when asked.

What will be the future effect of this movement it is difficult to predict. On the one hand we have a Society of long standing and prestige, numbering many eminent men in its ranks, and presided over by the venerable M. Bailly, who is beloved by everyone and has devoted himself heart and soul to the cause. The old Society has been for a long time the battle-field in which all the young artists have first taken up arms, and it has enjoyed long successes and honours. On the other hand, the new Society, with a title which is somewhat pretentious and in bad taste, since it does not, in fact, represent the national art any more than the other body, has obtained the adhesion of nearly all the representatives of the younger school, and its ranks are augmenting every day. Among the new recruits are already to be counted Ribot, Stevens, Lhermitte, Rixens, Sargent, Boldini, Boilvin, Binet, Maurice Courant, &c. There is therefore a great deal of curiosity and interest about it on the part of the public; and as, in reality, it is a movement of decentralisation in artistic matters, we have no objection to make to this dualism, provided that the State, which is always indulging the hope of resuming its original authority over the artists, does not profit by these divisions to assert an official right to interfere in questions which ought to be decided wholly by artists, instead of confining itself to the wholesome office of encouraging art by purchasing such works as seem worthy of acquisition for State collections.

Among other artists who have joined the new Salon, besides those already mentioned, are MM. Lambert, Edelfelt, Mesdag, Mathey, Toulmouche, John Lewis Brown, Dubufe, Mdme. Madeleine Lemaire, &c. The new Salon exhibitions will be open not only to all French but to all foreign artists, whose works must be sent in from the 1st to the 8th of March. The Sociétaires will have to the 26th April to complete and send in their works for exhibition.

From among the list of Sociétaires twenty names will be selected by lot to form a jury of examination of works sent in; but these names will not be published until the jury have completed their task.

It is hardly necessary to add that this event has given special importance to the annual election of officers of the Société des Artistes Français, which has just taken place. The election left no doubt, however, of the determination of the Société to affirm its position: M. Bailly was re-elected President by 60 votes out of 64; the two vice-Presidents, MM. Guillaume and Bouguereau, also obtained a large majority, and the secretaries, M. Chas. Garnier among them, were re-elected by acclimation.

The season of "expositions particulières" in Paris has commenced. At the Galérie Georges Petit is to be seen that of the works of M. Leopold Berstamm, sculptor, who has made a speciality of the exotic types of the Universal Exhibition (Indians, Javanese, Soudanese, &c.); an exhibition indicating at all events great ability and cleverness of execution. After this will follow the annual exhibition of the club of the Rue Volney, that of the water-colours of Madame Madeleine Lemaire at Goupil's, that of the "Peintres-Graveurs" at Durand-Ruel's; and, in a few weeks, the exhibition of the "Union Artistique" and that of the Water-Colour Society.

At its last sitting, the Municipal Council approved of the permanent retention not only of the Palaces of M. Formigé and the Galérie des Machines, but of the 30-mètre gallery and the Bouvard dome.* The Council has now to decide the treatment of the large space of ground between this latter building and the Seine. The scheme for this has actually been submitted to Parliament, which will pronounce upon it shortly. In the meantime the work of demolition goes on, and on the Esplanade des Invalides the Palais des Colonies, the Pagoda, and two or three foreign pavilions alone remain: even the elaborate and solid-looking palace of the Ministry of War has entirely disappeared. On the Champ-de-Mars the principal foreign pavilions are still in position; but the "Histoire de l'habitation" has disappeared.

While removing the remains of the Exhibition, the Government is at the same time occupied in dealing with those of the Cour des Comptes, which have for twenty years been an eyesore on the Quai d'Orsay. A special committee deputed by the Ministry of Instruction to report on the matter has sent in its report, which unfortunately points to a necessarily great expenditure: seven million francs for reconstruction if the two principal façades are utilised; ten millions if they are razed and rebuilt. The original foundations can in any case be utilised. It remains to be settled *what*, after all, will be built or rebuilt on the site. Will it be the ancient Cour des Comptes, or the new Musée des Arts Décoratifs asked for by M. Antonin Proust? The Committee has suggested nothing, and the Government authorities are perplexed. *Adhuc sub judice lis est:* and it is to be feared that in this doubtful case things will still be let alone, though it is really almost a public duty to remove this painful reminder of our civil discords; not to speak of other public interests that might be affected. There is a kind of demand for public work to put new life into the building trade of Paris—not that there is any lack of possible projects waiting for execution; besides the proposed new water supply from the sources of the Avre and the Vigne, there is the removal of the Gare des Sceaux, the new line from the Invalides to Moulineaux, and the metropolitan railway scheme. With this latter scheme are connected also important street improvements. Then there are the haulage railways for Belleville and Montmartre, and the "chemin-de-fer glissant," which it is proposed to establish on the old exterior boulevards,

* Unavoidably held over from last week, as we then stated.

† See p. 7, *ante*.

* This unexpected decision we think a serious mistake. M. Bouvard's dome and façade might pass muster as a temporary exhibition design, but regarded as a permanent building it is little better than architectural gingerbread.—ED.

from the Place Clichy to La Villette. There is, moreover, the long-desired completion of the Boulevard Haussmann; and here at least, considering the recent state of things, there ought to be decisive action. In view of the crowded state of the Boulevards Montmartre and des Italiens, and the narrowness of the adjacent streets, people are asking emphatically why the completion of this work has been so long delayed.

The École de Droit is soon to be enlarged, M. Lheureux being the architect entrusted with the work. The establishment as enlarged will occupy all the space between the Place du Panthéon and the Rues Cujas, St. Jacques, and Soufflot. The new buildings, which will cost about 250,000 francs, are to be carried out partly at the expense of the Government. They are to include an entrance-court from the Rue St. Jacques, with a vestibule and corridor connecting the new building with the old, a large theatre, lecture rooms on different floors, a hall for the distribution of prizes, and the enlargement of the library.

Another intended construction is an iron bridge at Conflans, between Charenton and Ivry, at a cost of about 850,000 francs.

The two national museums are to undergo some important alterations. At the Luxembourg, where the objects lent for the Centennial Exhibition have been reinstated, several new works are to be hung, among them the "Fermière Manda Lamétrie" of M. Roll and the "Rêve" of M. Détaille. The Museum at present contains 430 works, of which 300 are pictures. At the Louvre, the galleries on the first floor devoted to ceramics are to be considerably rearranged. In the Pastels room an allegorical ceiling by M. Hector Leroux has been fixed, divided into three compartments. The most important composition represents the triumph of Venus, another represents "Junon au bain," and the third the union of Greek and Latin poetry. In the Louvre there are also to be placed the "Sacre" of David, the fine portrait of General Fournier Sarlovèze by Gros, and the "18 Brumaire" of Bouchot. It has been said also that the Louvre is to have Manet's "Olympia," but this seems to be a mistake; a group of artists and amateurs combined to purchase this work of the impressionist master, but the Louvre is not concerned in the purchase.

At the École des Beaux-Arts the eighty-seven competitive designs in the second class, for a Maritime Sanatorium or hospital for children, have been before a jury presided over by M. Ginain; but only "mentions" have been awarded, "premières" to MM. Fiault, Petin. Armbruster, and Bretagne, and thirty-four "secondes mentions" to other competitors. In the competition in "éléments analytiques," subject a funeral chapel, fifty-one "mentions" have been given among sixty-one competitors; and in the sketch competition for a Prefecture of Police, "mentions" have been awarded to ten out of 132 competitors.

The competition in decorative composition for students in the three classes, the subject for which was a "cadran solaire," * has been a rather remarkable one, and after having voted a "première médaille" to M. Armbruster and second medals to M. Desgardin and M. Berger, the jury have added an expression of general satisfaction at the very high style of work exhibited.

For subjects modelled after casts, by architects, M. Bacot has obtained a medal, and for figures drawn after nature and after the antique thirteen "mentions" have been awarded. The level of architectural students' work this year, therefore, seems to be very good.

The month of January has brought a long obituary list, in part caused by the influenza epidemic, directly or indirectly. Among the deceased is an eminent member of the Académie des Beaux-Arts, Arthur Stanislaus Diet, a former pupil of Duban and Blouet, who has died at the age of sixty-three. He was Honorary Inspector-General of "Batiments Civils et Palais Nationaux," and Honorary Architect-in-Chief to the City of Paris. He obtained the Prix de Rome in 1853, the Cross of the Legion of Honour in 1867, and a medal of the first class in the Exhibition of 1878. In 1884 he was created Officer of the Legion of Honour and Member of the Institut. Diet was the architect of numerous important works; among which may be specially mentioned the completion of the Museum at Amiens, the new Prefecture of Police at Paris, the new Hôtel Dieu, the completion of the hospice of Charenton, and the architectural treatment of the new reservoirs of Montmartre. He was a fine artist and a man of benevolent character, and is universally regretted.

Another architect, Demangeat, has died in his 71st year: he took part in the construction of the quartier de l'Europe and of the old Gare St. Lazare.

Among engravers we have to record the death of Etienne Guillaumot, the illustrator of M. Alphand's "Promenades de Paris;" and that of Joseph Lefman, whose name is connected with the discovery of zincography, and who did a great deal generally to promote the art of facsimile reproduction.

Among painters who have died during the month are Bouquet, Saunier, Mayeur, and Protais. Michel Bouquet, who received a medal as long ago as 1835, and was 82 at the time of his death, excelled as a painter of faïence "sur cru," and all the ceramic museums possess examples of landscapes and seapieces painted on faïence by him. Noël Saunier, the landscape painter, who has died at the early age of 42, was a pupil of Pils, a modest and hard-working artist, whose exhibits at the annual Salons were much esteemed. Max Mayeur, also a landscape painter, has exhibited every year for twenty years past works of excellent character and truthfulness.

Alexandre Protais had made for himself a special name and fame in military subjects, in which he may be said to have been the precursor of Détaille and De Neuville. He has died of heart disease at the age of sixty-four. From 1853 to 1855 he painted various classes of subjects, but on the commencement of the Crimean War he followed the whole campaign, studying closely the military life which he so ably reproduced in his paintings. In 1857 he exhibited "The Battle of Inkerman," "The Taking of a Battery on the Mamelon," the "Death of Colonel Brancion," and the "Devoir." The success which these works had plainly pointed out his future path. In 1859 he followed the campaign in Italy, and returned with numerous studies. In 1861 he exhibited the "Deux Blessés" and "Une Sentinelle," the picture which drew from Théophile Gautier the remark that "M. Protais a trouvé la Poésie du Soldat." The "Matin avant l'Attaque" and the "Soir après le Combat," exhibited in 1863, brought his reputation to its height. During the last war he served in the army under General Ladmirault.

Protais had received medals in 1863, 1864, and 1865; he became officer of the Legion of Honour in 1877, and obtained a medal at the 1878 Exhibition. By his artistic truthfulness, his perfect courtesy, and the great "distinction" of manner which characterised his personal bearing, he had gained the regard and esteem of artists of all schools, and in his later years was appointed on the jury regularly at each annual exhibition. He was not only an excellent painter, but a thoroughly good man.

We hear at the last moment of the death of M. Jules André, architect and member of the Académie des Beaux-Arts. André was born in Paris in 1819, and studied at the École des Beaux-Arts; he obtained the second prize in architecture in 1842, and the Prix de Rome in 1847, in a competition of which the subject was "Une Chambre des Deputés." He went to Rome, and thence to Greece, where he executed a fine restoration of the Temple of Theseus. On his return to Paris in 1852, he was appointed "Inspecteur des Travaux" at the Natural History Museum, and "Sous-inspecteur" at the National Library, and subsequently diocesan architect for Corsica. In 1867 he was appointed chief architect to the Museum, and built the gallery with the monumental façade which terminates the main avenue of the Jardin des Plantes.

André was an officer of the Legion of Honour, and a distinguished professor at the École des Beaux-Arts; and in 1884 he succeeded to the place formerly filled by Lesueur in the Institut.

* It would seem from this that the attention which has been given to the subject of sundials the last year or so is not peculiar to England.—ED.

The New Harbour at Copenhagen.—The Danish Government has presented a bill to the Parliament for the immediate construction of a new harbour at Copenhagen, a scheme under contemplation for some time. It will be situated on the so-called "Castle Point," and divided into two parts, covering a total of about four million cubic feet.

ROMAN ARCHITECTURE.*

BY PROFESSOR AITCHISON, A.R.A.

PLINY THE YOUNGER'S LAURENTINE AND TUSCAN VILLAS.

THERE are but few sources from which we can get a distinct idea of the arrangement of a Roman house. These sources are the remains at Herculaneum and Pompeii (although Pompeii was probably a sort of Roman Margate or Broadstairs), the descriptions of houses and villas in the Roman writers, and the description of some of the parts of a house in the treatise of Vitruvius.

We must bear in mind that Vitruvius's treatise was published with illustrations, though they have unfortunately perished, and that he never describes anything that was well-known to his contemporaries; so we are unable to construct a house from his description. He seems to have published his treatise just as the great improvements in Rome were begun by Augustus, when the Roman peace allowed wealth to accumulate, and architecture and building to develop throughout the civilised world. We cannot, therefore, be sure that great variations in the arrangement of houses did not take place after the publication of Vitruvius's treatise.

The parts of a house Vitruvius mentions are these:—The Vestibulum, or vestibule, where the toga was put on before going out; the Cavædium, or atrium, the first main hall, though Pliny calls this the Atrium only, and the second, or innermost one, the Cavædium,—the middle one he merely calls a portico; the Alæ, or wings; the Tablinum, or muniment-room, which was used as a hall of audience; the Fauces, passages that ran on each side of the Tablinum to the back or private part of the house; Cubicula, living-rooms, but where one might take a midday nap; Peristylium, the peristyle round the garden at the back of the Tablinum; Triclinium, the dining or banqueting-room; Exedræ, rooms for conversation; Œci, halls, often used for banquets, called tetrastyle, Corinthian, Egyptian, and Cyzicene; Pinacotheca, the picture-gallery; Bibliotheca, the library; Balineum, the bath; Culina, the kitchen; Cænaculum, originally a supper-room above the ground-floor, but eventually used to describe the garret or cock-loft; and, in noblemen's houses, the Basilica, originally a hall for trying cases referred to them, or for meetings on party questions, and subsequently for recitations.

After hearing the names of the rooms that are given by Vitruvius, we shall best see their arrangement in the description of his villas by Caius Plinius Cæcilius Secundus, commonly called the Younger Pliny, or Pliny the Consul, the nephew and adopted son of Pliny the Elder, who wrote the Natural History. It must be borne in mind that his Laurentine Villa was a suburban retreat, mainly used in the winter (for he tells us that he resided at his Tuscan villa in the summer), and it was mainly used in the afternoon and at night, when his work in Rome was done.

In giving the translation, I have inserted the Latin names of such portions as may be necessary to identify them with those described by Vitruvius, though there are several parts whose names are not found in that author.

Pliny describes his Laurentine Villa in a letter to Gallus (Lib. 2, 17). The translation given is by Melmoth, as emendated by the Rev. F. C. T. Bosanquet, but I must warn you that the English words used as translations of the parts of the villa may mislead you, for it is by no means certain that they adequately convey the meaning of the Latin ones; *e.g.*, *atrium* is translated by "courtyard," while it is still a question as to what it was, and according to Vitruvius it was a covered hall, with or without an opening in the middle. I now give you Pliny's words:—

"My villa is of convenient size, without being expensive to keep up. The courtyard (atrium) in front is plain, but not mean, through which you enter the porticoes, shaped into the form of the letter D," (but Mr. Bosanquet is of opinion that there were two D-shaped porticoes, and that the space between them was the area. In some editions the letter is "O," and a circular or oval portico was shown by the elder restorers) "enclosing a small but cheerful area between. These make a capital retreat for bad weather, not only as

* Being the second Royal Academy Lecture on Architecture this session. Delivered on Thursday evening, January 30.

they are shut in with windows (specularibus), but particularly as they are sheltered by a projection of the roof." (I believe he means by "imminentibus tectis" covered by a lean-to roof, otherwise the passage is nonsense, if the windows were wholly glazed.) "From the middle of these porticoes you pass into a bright pleasant inner court (Cavædium), and out of that into a handsome hall (Triclinium—a dining or banquetting room) running out towards the sea shore, so that when there is a S.W. breeze, it is gently washed with the waves, which spend themselves at its base. On every side of this hall (the dining-room) there are either folding doors, or windows equally large, by which means you have a view, from the front and two sides, of three different seas, as it were—from the back you see the middle court, the portico, and the area; and from another point (about which there is nothing in the original) you look through the portico into the courtyard (Atrium), and out upon the woods and distant mountains beyond.

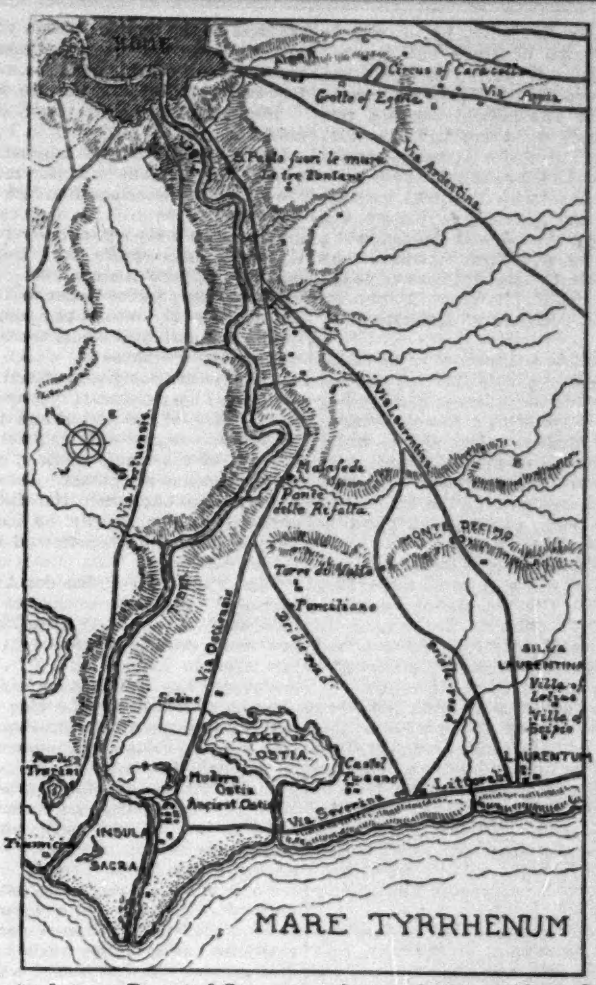
On the left hand of this hall (the dining-room) a little farther from the sea lies a large drawing-room (cubiculum, a sitting-room, or a room in which you might sleep, but not a night bedroom), and beyond that a second of smaller size, which has one window to the rising, and another to the setting sun; this as well has a view of the sea, but more distant and agreeable. The angle formed by the projection of the dining-room with this drawing-room retains and intensifies the warmth of the sun, and this forms our winter quarters, and family gymnasium" (family, here applies to his slaves and freedmen), "which is sheltered from all the winds, except those which bring on clouds, but the clear sky comes out again before the warmth has gone out of the place. Adjoining this angle is a room forming the segment of a circle (in apsida curvatum), the windows of which are so arranged as to get the sun all through the day. In the walls are contrived sorts of cases, containing a collection of authors who can never be read too often. Next to this is a bedroom" ("membrum dormitorium": I incline to the opinion that this is a wing of bedrooms) "connected with it by a raised passage furnished with flue-pipes (this should be a hanging passage, "suspensus et tubulatus"), which supply at a wholesome temperature, and distribute to all parts of this room the heat they receive.

The rest of this side of the house is appropriated to the use of my slaves and freedmen; but most of the rooms are respectable enough to put my guests into.

In the opposite wing is a most elegant, tastefully fitted-up bedroom, next to which lies another, which you may call a large bedroom, or modified dining-room" (I believe he means a moderate-sized eating-room). "It is very warm and light, not only from the direct rays of the sun, but by their reflection from the sea. Beyond this is a bedroom, with an ante-room (procœton), the height of which renders it cool in summer, its thick walls warm in winter, for it is sheltered every way from the wind. To this apartment another ante-room (procœton) is joined by one common wall.

Thence you enter into the wide and spacious cooling-room (cella frigidaria) belonging to the bath (balineum), from the opposite walls of which two curved basins (baptisteria) are thrown out, so to speak; which are more than large enough, if you consider that the sea is close at hand." (This seems rather far-fetched, and I believe he means, if you like to swim in what is close at hand.) "Adjacent to this is the anointing-room (unctuarium), the sweating-room (hypocauston), and beyond that the bath heating-room (propnigeon). Adjoining are two other little bath-rooms, elegantly, rather than sumptuously, fitted up. Annexed to them is a warm bath (calida piscina) of wonderful construction, in which one can swim, and take a view of the sea at the same time. Not far from this stands the tennis-court (sphæristerium), which lies open to the warmth of the afternoon sun.

Thence you go up a sort of turret, which has two rooms (diætæ) below with the same number above, besides a dining-room (cœnatio), commanding a very extensive look-out on to the sea, the coast, and the beautiful villas scattered along the shore-line." (It seems to me that what Pliny says is that on this a tower or belvidere is built, for the space contains two rooms and a dining-room, so you could scarcely call it a turret.) "At the other end is a second turret, containing a room (cubiculum) that gets the rising and setting sun. Behind this is a large



Map of the Country between Rome and Laurentum, showing the Site of Pliny's Laurentine Villa.

store-room and granary" (Apotheca et Horreum: it is supposed that this latter was not a granary, but a room for curiosities), "and, underneath, a spacious dining-room, where only the murmur and break of the sea can be heard even in a storm. It looks out upon the garden, and the gestatio running round the garden. The gestatio is bordered round with box, and, where that is decayed, with rosemary; for the box, wherever sheltered by the buildings, grows plentifully, but, when it lies open and exposed to the weather and spray from the sea, though at some distance from this latter, it quite withers up. Next the gestatio, and running along inside it, is a shady vine plantation" (I presume what the Italians call a pergola), "the path of which is so soft and easy to the tread that you may walk barefoot upon it. The garden is chiefly planted with fig and mulberry trees, to which the soil is as favourable as it is averse from all others.

Here is a dining-room (Cœnatio) which, though it stands away from the sea, enjoys the garden view, which is just as pleasant: two apartments (Diætæ) run round the back part of it, the windows of which look out upon the entrance of the villa (Vestibulum villæ), and into a fine kitchen-garden. From here extends an enclosed portico (cryptoporticus), which from its great length you might take for a public one. It has a range of windows on either side, but more on the side facing the sea, and fewer on the garden side, and these, single windows and alternate with the opposite rows. In calm, clear weather, these are all thrown open; but if it blows, those on the weather side are closed, whilst those away from the wind can remain open without any inconvenience. Before this enclosed portico lies a terrace (Xystus) fragrant with the scent of violets, and warmed by the reflexion of the sun from the portico, which, while it retains the rays, keeps away the North-East wind; and it is as warm on this side as it is cool on the side opposite; in the same way it is a protection against the wind from the south-west, and thus, in short, by means of its several sides, breaks the force of the winds from whatever quarter they may blow. These are some of its winter advantages. They are still more appreciable in the summer time; for at that season it throws a shade upon the terrace (Xystus) during the whole of the forenoon, and upon the adjoining portion of the gestatio and garden in the afternoon, casting a greater or less shade on this side, or on that, as the day increases or decreases. But the portico itself is coolest just at the time when the sun is at its hottest, that is, when the rays fall directly upon the roof. Also, by opening the windows, you let in the western breezes in a free current, which prevents the place getting oppressive with the close and stagnant air. At the upper end of the terrace and portico stands a detached garden building, which I call my *favourite;* my favourite, indeed, as I put it up myself. It contains a very warm winter room (Heliocaminus), one side of which looks down on to the terrace (Xystus), while the other has a view of the sea, and both lie exposed to the sun. The bedroom opens on to the covered portico by means of folding doors, while its window looks out upon the sea." (This last sentence seems to me to be altogether incorrect, though correctly given by Melmoth as follows:—"Through the folding-doors you see the opposite chamber, and from the window is a prospect of the enclosed portico")

"On that side next the sea, and facing the middle wall, is formed a very elegant little recess, which by means of transparent windows (Specularibus) and curtains (Velis) drawn to or aside, can be made part of the adjoining room, or separated from it. It contains a couch and two chairs; as you lie upon this couch, from where your feet are you get a peep of the sea; looking behind you, you see the neighbouring villas, and from the head you may have a view of the woods; these three views may be seen either separately, from so many different windows, or blended together in one.

Adjoining this is a bedroom (Cubiculum nocturnis et somni) which neither the servants' voices, the murmuring of the sea, the glare of lightning, nor daylight itself can penetrate, unless you open the windows. This profound tranquillity and seclusion are occasioned by a passage (Andrôn) separating the wall from that of the garden, and thus, by means of this intervening space, every noise is drowned." (This word "Andrôn" was used by the Greek writers for the public dining-rooms for men.

It is mentioned by Vitruvius, lib. 6, cap. 7, p. 5, in his description of Greek buildings:—"But between the two peristyles there are passages, which are called Mesaulæ, because they are placed in the middle between two halls; but our people call them Andrônes. But this is very remarkable, for it neither suits Greek nor Latin. The Greeks call these halls Ἀνδρῶνας where the men's banquets are, because women do not go there." The word is still in use in Italy. Andrône is defined as "a covered place, long and narrow, which goes from the street-door to the staircase or to the court in houses which have no Atrium or Vestibule." *Vide* Vocabolario Domestico, by Carena. 1859.

"Annexed to this is a tiny stove-room, which by opening or shutting a little aperture lets out or retains the heat from underneath, according as you require. Beyond this lies a bedroom (Cubiculum), and ante-room (Procœton), which enjoy the sun, though obliquely, indeed, from the time it rises till the afternoon." (I have taken no notice of any part of the translation I did not agree with, except such parts as relate to the buildings.)

Although this letter seems to me to be a very agreeable one, I fear it has appeared rather long to you; but as it is the programme on which V. Scamozzi, J. F. Felibien des Avaux, R. Castell, P. Marquez, Macquet, Haudebourt, and Bouchet have constructed their restorations,* I did not see how I could help giving it you.

Pliny describes himself as not rich, but when one considers that he had a town house, this suburban retreat, and his country house at Città de Castello, in Tuscany, and tells us that he had several villas on Lake Larius (the Lake of Como), two of which he liked best, and villas at Frascati, Tivoli, and Palestrina, that he built a temple, endowed a college, presented money to his friends, and bought a small piece of property for 24,000*l.*, we must suppose him to have been comfortably off.

You have probably observed that he does not say a word about those parts of the house that were used by his wife, nor does he give the slightest indication of the outward appearance of his villa, nor deign to mention the architect of this or any other of his villas; and from what he says of the other Fine Arts, we may judge of the still lower estimation in which he held our profession—*e.g.*: "However, as you would direct a painter or sculptor who was representing the figure of your son what parts he should re-touch or express, so I hope you will guide and inform my hand in this more durable, or (as you are pleased to think it) this immortal likeness which I am endeavouring to execute." He thought polite letter-writing was not only the highest art, but so much beyond comparison with all others, that he scarcely deigns to mention them. When Pliny was about to rebuild the Temple of Ceres, he wrote the following letter to Mustius, who is supposed to have been an architect, and Haudebourt supposes he was the architect who built the Laurentine Villa:—

"In compliance with the advice of the Aruspices, I intend to enlarge and beautify the Temple of Ceres, which stands upon my estate. It is indeed a very ancient fabric, and though extremely small, yet upon a certain stated anniversary is much frequented. On Sept. 13, great numbers of people from all the country round assemble there, at which time many affairs are transacted, and many vows paid and offered; but there is no shelter at hand for them either from sun or rain. I think, therefore, I shall perform an act both of piety and munificence if, at the same time that I build a beautiful temple, I add to it a spacious portico; the first for the service of the goddess, the other for the use of the people. I beg, therefore, you would purchase for me four marble pillars, of whatever kind you shall think proper; as well as a quantity of marble for laying the floor and encrusting the walls. You must also either buy a statue of the goddess or get one made; for age has maimed, in some parts, the ancient one of wood which stands there at present. With respect to the portico, I do not recollect there being anything you can send me that will be serviceable, unless you will sketch me out a plan suitable to the situation of the place. It is not practicable to build it round the temple, because it is encompassed on one side by the river, whose banks are exceedingly steep, and on the other by the high road. Beyond this road lies a very large meadow, in which the portico may be conveniently enough placed, opposite to the temple; unless you, who know so well how to conquer the inconveniences of nature by art, can hit upon some better plan.—Farewell."—(Pliny's Letters, lib. 9, lit. 39.)

Scamozzi's is, I believe, the first attempt at a restoration. It is published in his book called "An Idea of Universal Architecture," in 1615, and by Felibien, but it is not much more like the villa Pliny describes than Newton's.* In his drawing, the shape of the portico was given as an O, and he makes it circular [see lithograph in this number of *Builder*], and he seems to believe that the Atrium and Cavædium were both open; he puts the Cyzicene Hall into the sea, and supposes the second bedroom to the left to be the gymnasium; he puts the two towers over his garden entrances on either side, and the bath-rooms are not distinguished from the other rooms, and his cloisters (Cryptoporticus) he puts on both sides of the Atrium and circular portico, without any regard to Pliny's description of the position of his single cloister, and omits the garden pavilion altogether. Scamozzi's plan is a very fine one, with the internal circular portico, but can hardly be looked on as a serious attempt to reconstruct the villa from Pliny's description.

Jean François Felibien des Avaux, who was secretary to the Academy of Architecture, published his book at Paris in 1699, though the one most commonly known in England was published in London in 1707. He, being an antiquary, has made a much more careful attempt to construct the plan in accordance with Pliny's words than Scamozzi, though the plan is by no means so good, merely looked on as a plan; this, however, was to be expected, for we naturally look for a good plan from an architect of Scamozzi's reputation.

To return to Felibien's plan [see lithograph] his Atrium is a very shallow portico preceding the large circular one, his Cavædium is a large open court, and his Cyzicene dining-room keeps quite clear of the sea, and so leaves a terrace for the athletic exercises, but if the sea washed the foot of the dining-room, I fear it would wash the terrace too. In the angle room at the extreme left he altogether ignores the Apse. To the right of the dining-room we get a room, and ante-room, not mentioned in Pliny's description, nor does the Piscina correspond with the description, as it is doubtful if you could get a glimpse of the sea from it while swimming; there is no unctuarium, and the tennis-court has only two small windows to the west, the main light being from the north. There are no staircases shown to the two towers, and it is by no means certain that the dining-room, with its two chambers, was detached; instead of two, he makes seven chambers, beside the dining-room. The Diæta is sometimes used like the French word *appartement*, meaning a suite of rooms.

The Garden Pavilion certainly does not answer to the description as regards the divisible room, for the Cryptoporticus could not be seen from its window.† The night bedroom opens on to the area of a peristyle which does not seem to answer to the common acceptation of Andron, and the store-room and granary are omitted. It is possible that he supposed these to be over the dining-room as Haudebourt does, but it seems rather a curious position for them, though Pliny himself uses the word horreum for a museum, repository, or lumber-room for curiosities (see letter 18, book 8, Pliny's Epistles).

As Pliny does not give a single dimension (what would we not give for him to have stepped the width and depth of his villa and those of some of the main parts!), does not name the offices nor give the number of his servants' rooms, is vague about the connexion of the various parts of the villa, and does not tell us which way they turn, it is not easy to solve the problem, nor is it wonderful that everyone who has attempted the solution has constructed it differently.

R. Castell, in his book on the villas of the ancients (fol., London, 1728), gives his translation of Pliny's letter to Gallus describing his Laurentine villa, and is quite original in his restoration; though we must not forget that before the excavations at Pompeii, architects knew even less than they do at present about Roman houses. The Atrium is shown as a great open forecourt the whole width of the villa [see lithograph], and about two-thirds of its width in depth.

The portico, in the shape of an O, is a large oval. The Cavædium is also open, with two porticoes projecting into it, on the right and left; the one on the right being the width of the cold room; the Cyzicene dining-room has a portico in front that forms a vestibule to it, and the room itself scarcely extends to the edge of the shore. He makes the rooms to the right and left of the dining-room of the same size, and gets a vestibule, the small room, and the library into the left apsidal wing. His supper-room to the right corresponds with the other wing, the end being also apsidal; he then gets the bedroom and ante-room on the left. The cold room of the bath on the right flank is very large, with two semicircular baths, a large anointing-room, and the two bath-rooms; but his hypocaust is the furnace for heating the water, and not the sweating-room. Beyond these, again, is the tennis-court, and attached to the angle of that are enormous dining-rooms. He puts his swimming-bath on the first floor, as well as the two apartments, and the other rooms he puts on the second floor. The covered portico he makes wide enough to require two columns in its width, and consequently to form three aisles; he attaches it to the side of his Atrium, with the garden face to the west; the supper-room and two suites of rooms next the Atrium; and the small garden pavilion at the other end.

The recess in this pavilion that held the couch and two chairs he makes come out of the warm-room, as Haudebourt has done after him. No hypocaust is shown, and the bedroom windows look out on one side into a dark passage (Andron) and on the other into the covered portico.

P. Marquez, who was, I believe, a Mexican priest, published at Rome his restoration in 1796. He shows the villa of much greater pretensions than the description of the owner would lead us to believe, as he shows two open courts [see lithograph], with the surrounding chambers to the right and left of the buildings on either side of the Cavædium, about which there is not a word in Pliny's letter. He gives a vestibule, a small Atrium, and puts his circular portico into the open space which he calls the Cavædium: the Cyzicene dining-room is far from the sea: he gives no tennis-court, and supposes they played on the terrace: he shows two towers, with the barn and store-house between them: the Cryptoporticus has a bend in it: his garden pavilion is in pieces, the Heliocaminus being detached.

Haudebourt is the next who has made a restoration; he was a French architect, known throughout Christendom by his work on B. Peruzzi's Palazzo Massimi at Rome, and who had also the advantage of having seen the published drawings of Pompeii, and the ruins themselves; in most respects his restoration agrees best with the description.

He shows a vast portico in front, not mentioned by Pliny [see lithograph]; behind it are the two front cells of the Ostiarius and Atriensis (though he allots both to the Atriensis), with the passage between them, leading into a tetrastyle Atrium with Alæ, but no tablinum; the portico is D shaped, and the peristyle of it has square piers; he does not leave the Cavædium as an open space, but surrounds it with porticoes, eight columns lengthwise to each side, and six to the shorter ends. It is hardly likely that an open court should be left as the only means of getting to the banqueting-hall in a villa that was mainly used as a winter residence, as all the other restorers have done; but one of these porticoes, *i.e.*, that on the left, would prevent the setting sun from entering the back window of the smaller room to the left of the main banquetting-hall. The apsidal room is made circular inside, but square outside, with recesses for the book cases. In the bath, the warm swimming-bath (Calida piscina) is very small, and the sweating-room (Hypocaustum) circular. The tennis-court (Sphæristerium) is open to the north-west; the inclosed portico (Cryptoporticus), after running parallel with the sea, turns towards it at a right angle, and runs nearly to it. At the end is the garden pavilion, projecting a little into the sea, but he makes the Heliocaminus the room with the recess, which does not seem to me to be what Pliny describes.

I cannot pass to the next restorer, Bouchet, without paying an affectionate tribute to the memory of this delightful enthusiast, who trudged

* See plans of six of these restorations in this week's *Builder*.—Ed

* This learned translator of Vitruvius gives an illustration of the villa pseudo-urbana, founded on Pliny's description.

† We do not quite understand this criticism of Professor Aitchison's; as in the translation of Pliny's letter, as given above, it is not said that the windows of this chamber looked upon the Cryptoporticus.—Ed.

from Rome to Ostia, along the road Pliny once travelled, slept on rushes in the prison there, and walked over the ruins, then covered with earth and verdure, visited the Holy Island made by the fork of River Tiber, between Ostia and Fumicino, which once contained a Temple of Apollo,—and where games in his honour were celebrated,—and trudged back to Rome, by the Laurentine-road, close to the villas of Scipio and Lælius, and dreamt that he had an introduction to Pliny, who showed him over part of his villa, and then turned him over to his architect, Mustius, to show him the rest. The relish with which he discusses every part of the Roman house and the learning he displays is both delightful and admirable. I found I had been forestalled by him in the scraps of knowledge I fancied I was bringing fresh to the subject from Plautus and Terence (Plaut, Mil. Glor. Act 2, S. 3, line 16; and Act 2, S. 2, line 4, Amp. 5, 1, 59, Epid. 2, 2, 43, Terence Eun. 3, 5, 41), for Vitruvius calls the opening in the roof of the Atrium "Compluvium," while Plautus and Terence call it "Impluvium."

Jules Bouchet, a French architect, published his restoration at Paris in 1852, and though he owes much to Haudebourt, he has taken great pains, and shows great ingenuity in trying to make his plan agree with the description.

He puts a decastyle portico in the front [see lithograph], with four columns on each flank, about which Pliny is silent; he has the two porters' rooms with the passage between, and a tetrastyle Atrium with Alæ; he adds a tablinum, not mentioned by Pliny, with one passage, and rooms on either side the tablinum. His portico takes the D shape of the late editions of Pliny; his Cavædium is a vast open court from which the Cyzicene dining-room opens directly.

To get the sea washing its foot he has made it very long, and broken the terrace so that to the left is a wide terrace for the athletic exercises. To the left of the dining-room are the two chambers, and the third one with an apsidal end, and he has shown the space between that and the warmed bedroom, which Pliny describes. To the right are the other two chambers, though Pliny says nothing about the further one being apsidal. He makes an ample ante-room to lead to the Baths, and another large room adjoining it. The cold room has two ample cold baths, but the anointing-room, the sweating-room, and the furnace-room can only be got at from the two chambers. The hall containing the piscina takes the whole depth of the building, with porticoes at each end, and the tennis-court is separated from the baths by a long passage, with stairs to the towers at each end. Under the south tower are the two rooms and the dining-room. By breaking back the coast-line, he gets a view of the sea from the window on the west side of the dining-room, but he leaves out the museum and the store-room, though possibly he makes them on the first floor. He translates the obscure passage about the north tower as having the bedroom above, and the little pavilion fulfils all the requirements, except that the sleeping-room has only one window, and Pliny says "windows." Bouchet gives all the plans but one of the former restorers, as well as one by Macquet not published, but he omits Castell's.

I give you the extracts from Pliny's letter to Domitius Apollinaris (Lib. 5, Let. 6), describing his Tuscan villa, partly because Felibien, Castell, and Marquez have tried to restore it, and partly because you may as well have as much additional light as it can throw on the Laurentine. In this description, however, there is such an absence of method and such vagueness that any attempt to restore it is merely an exercise of the imagination.

[We omit here the letter describing the Tuscan villa of Pliny, as we shall be able to give next week Castell's restoration of it, and the description will be of more interest when taken in connexion with the plan.]

In spite of the charges of luxury and vanity that have been made against Pliny, which perhaps are not altogether without foundation, he seems to have been a courageous and hard-working man, and one determined to do right in spite of consequences, for he was proscribed by Domitian, and only escaped through the tyrant's death. He was certainly a liberal man, with kindly feelings, and humane enough not to have his farm tilled by chained slaves; of refined tastes, and enjoying the friendship of all the principal authors of his time.

Pliny is a sufficiently interesting man to make it perhaps worth one's while to investigate the charges against him. The charge of luxury seems to be founded mainly on the number of his villas. There were eight at least, but most of these were farms from which came the greater part of his income, for he tells us so, and that he only had a portion of his money at usury. No one would now call a man a sybarite if he had forty farms. A town and country house and a suburban villa is not more than many a successful barrister of the present day indulges in. Pliny, unfortunately, does not give us the bill of fare of his banquets, but three snails are all the meat, or, as the Italian would say, fish, he provides for the dinner he has with a friend; he sees the rope-dancing, pantomimes, and the can-can at his neighbour's houses, but does not have them at home. Very few rich men now are Anchorites.

He was evidently a case-winner as a barrister; he was Governor of Bithynia, and a friend of Trajan. Success, high employment, and the friendship of the great do not usually conduce to great modesty, and though vanity lies mainly in the temperament, would not most of us be vain if we spent so much time on our works that we could even hope they might last and be popular for 1800 years? Perhaps we cannot place much reliance on Martial's panegyric, as Pliny paid his travelling expenses to Spain. I now give you his account of how he spent his time in the country:—*

"You want to know how I portion out my day in my summer villa at Tuscum? I get up just when I please; generally about sunrise, often earlier, but seldom later than this. I keep the shutters closed, as darkness and silence wonderfully promote meditation. Thus free and abstracted from those outward objects which dissipate attention, I am left to my own thoughts; nor suffer my mind to wander with my eyes, but keep my eyes in subjection to my mind, which, when they are not distracted by a multiplicity of external objects, see nothing but what the imagination represents to them. If I have any work in hand, this is the time I choose for thinking it out, word for word, even to the minutest accuracy of expression. In this way I compose more or less, according as the subject is more or less difficult, and I find myself able to retain it. I then call my secretary, and opening the shutters, dictate to him what I have put into shape, after which I dismiss him; then call him in again, and again dismiss him. About ten or eleven o'clock (for I do not observe one fixed hour), according to the weather, I either walk upon my terrace, or in the covered portico, and there I continue to meditate or dictate what remains upon the subject in which I am engaged. This completed, I get into my chariot, where I employ myself as before, when I was walking, or in my study; and find this change of scene refreshes, and keeps up my attention. On my return home, I take a little nap, then a walk, and after that, repeat out loud and distinctly some Greek or Latin speech, not so much for the sake of strengthening my voice, as my digestion; though indeed the voice at the same time is strengthened by this practice.

I then take another walk, am anointed, do my exercises, and go into the bath. At supper, if I have only my wife or a few friends with me, some author is read to us; and after supper we are entertained either with music or an interlude. When that is finished I take my walk with my family, amongst whom I am not without some scholars. Thus we pass our evenings in varied conversation; and the day, even when at the longest, steals imperceptibly away. Upon some occasions I change the order in certain of the articles above mentioned. For instance, if I have studied longer, or walked more than usual, after my second sleep, and reading a speech or two aloud, instead of using my chariot, I get on horseback, by which means I ensure as much exercise and lose less time. The visits of my friends from the neighbouring villages claim some part of the day; and sometimes, by an agreeable interruption, they come in very seasonably to relieve me when I am feeling tired. I now and then amuse myself with hunting, but always take my tablets into the field, that if I should meet with no game I may at least bring home something. Part of my time, too (though not so much as they desire), is allotted to my tenants, whose rustic complaints, along with these city occupations, make my literary studies still more delightful to me. Farewell!"

* Book IX. Letter 36. To Fuscus.

ARCHITECTURAL SOCIETIES.

The Architectural Association.—The ordinary fortnightly meeting of this Association was held on Friday, Jan. 31, the President, Mr. Leonard Stokes, in the chair.—Mr. E. S. Gale, hon. secretary, announced that the first sessional visit would be made this day, Saturday, Feb. 8, to Mr. D'Oyly Carte's new theatre in Cambridge-circus, Shaftesbury-avenue. Arrangements had also been made for the second sessional visit, which would be to the Imperial Institute, South Kensington, on Saturday, the 22nd inst., when Mr. Colcutt, the architect of that building, had promised to meet the party. —Mr. F. R. Farrow, senior hon. secretary, announced that the "Common Room" discussion which should have taken place on the 28th ult. had been postponed to Tuesday, Feb. 11, when the subject to be discussed will be "A Revised Scheme of Architectural Training." The discussion will be opened by Mr. A. W. Earle.—Mr. Farrow also read a letter from the Rev. T. H. Le Bœuf, rector of Croyland, appealing for subscriptions for the restoration of Croyland Abbey. About 3,000*l.* is the sum needed. —The Chairman said he regretted to announce that Mr. Mountford, who was to have read a paper on "Free Libraries," was confined to his bed by an attack of influenza; but he had entrusted his paper to Mr. H. D. Appleton, who then proceeded to read it. We regret, however, that in consequence of the space occupied by Professor Aitchison's lecture, we must hold over our detailed report of the meeting and discussion until next week.

Liverpool Architectural Society.—The fifth ordinary meeting of this society was held on Monday evening, in the Royal Institution, Colquitt-street. Mr. T. Mellard Reade occupied the chair, and there was a pretty numerous attendance. The principal business before the meeting was a paper entitled "Mouldings," read by Mr. T. H. Haigh. The lecturer spoke of mouldings as being of the very first importance in all architectural detail, so much so that unless a student or professor had a sound and thorough knowledge of its alphabet, it was impossible for him to produce any work of any really true or artistic merit. Great ignorance of the subject prevailed among architects of fifty years ago, and though much progress had been made in recent years in this department, the knowledge of modern architects on the subject was not so complete as could be desired, many important buildings being wofully deficient in detail. A knowledge of mouldings was also most essential to the architect in enabling him to determine the dates of old buildings, their mouldings being often the only guide. In main lines and features the ancient builder sometimes copied work of a much earlier period than his own, but their mouldings were almost invariably to be depended upon as those of their own epoch.

Manchester Architectural Association.—At a meeting of this Association, held at the Diocesan Buildings on Tuesday last, Mr. J. H. Woodhouse, President, in the chair, Mr. J. A. Gotch, F.R.I.B.A., of Kettering, read a paper on "The Homes of Queen Elizabeth's Courtiers." After giving a general sketch of the domestic arrangements of the homes of the nobles prior to this period, he pointed out that it was about this epoch that house-planning took a new departure. Whereas formerly safety from invasion was the chief object to be attained, even at the sacrifice of convenience, internal comfort began to be studied. Light was admitted by large window openings in place of narrow slits. In speaking of Hardwick Hall, with its large and numerous windows, Lord Bacon remarked "there was too much light, it was impossible to get out of the sun, always streaming through the windows." The paper was illustrated by views shown by an oxy-hydrogen lantern. A vote of thanks was proposed by Mr. Booth, seconded by Mr. Davies-Colley, and supported by Messrs. Mould, Mee, Hodgson, and Chadwick.

SURVEYORSHIPS.

Aberdare. — Mr. T. Lloyd Edwards has resigned his position as Surveyor to the Aberdare Local Board.

Wimbledon.—Mr. W. Santo Crimp, Engineer and Surveyor to the Wimbledon Local Board, has been elected Assistant Engineer to the London County Council.

Illustrations.

BRONZE STATUE OF VICTORY, ROMAN MUSEUM, BRESCIA.

THE statue is a little over life-size, and a beautiful bronze casting. It has the distinction of being, we believe, the most complete large statue of "Victory" yet found, as only the shield, and the helmet under the foot, are restorations. The drawing was made in pen-and-ink on the spot, and was exhibited at the Royal Academy, 1888.

RESTORED PLANS OF PLINY'S LAURENTINE VILLA.

THREE-FOURTHS of our illustration plates are occupied this week by reproductions of the various plans for the restoration of Pliny's villa collected by Professor Aitchison as illustrations to the second of his present series of Royal Academy lectures. They are referred to and described in the lecture, printed in full in another column.

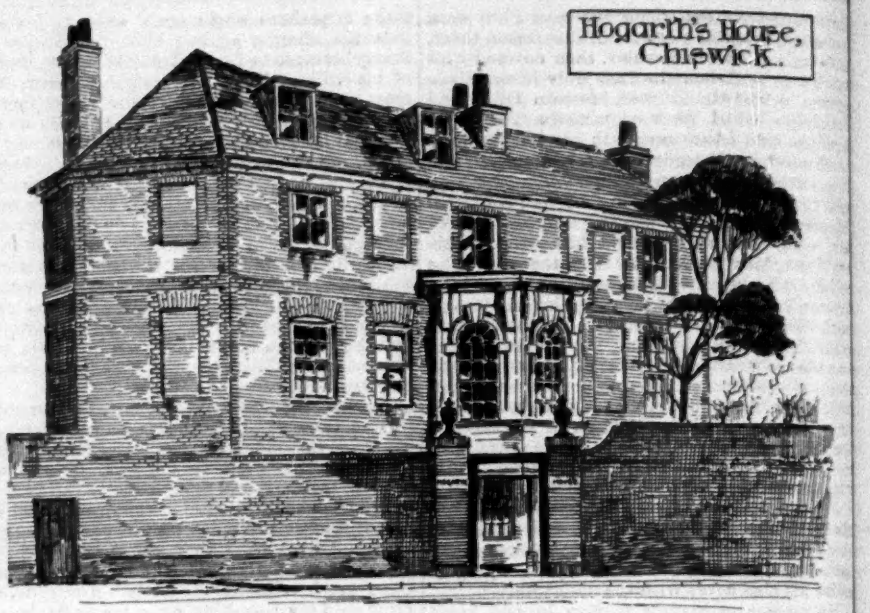
As embodying the ideas of eminent architects of various periods since the Renaissance in regard to the plan of a typical Roman villa, we hope their juxtaposition in one issue, and in connexion with Professor Aitchison's interesting and learned lectures, may be of permanent value to students of Roman architecture.

We are indebted to Professor Aitchison's courtesy in placing the plans, as prepared by him, at our disposal.

HOGARTH'S HOUSE, CHISWICK

THIS house, which stands about half-way up Hogarth-lane, on the west side, is a good specimen of the brick house of the eighteenth century. The walls generally are of red stock bricks with rubbed brick dressings. The chief features are a bold wooden bay-window on the north side (which is the principal front) supported now on an iron column, and a moulded wooden eaves course. The gutter has disappeared, and the roof is in a ruinous condition. There are two good gate-posts, but the old gates which were probably here have been replaced by a wooden door.

The entrance-door is just to the right of the bay-window, on the ground floor, and near this is a window retaining some lead glazing. The house stands at a sharp angle with the road, the east wall abutting on it.



THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE sixth ordinary meeting of this Institute for the present session took place on Monday evening last, Mr. Arthur Cates, Vice-President, in the chair.

Obituary.

Mr. W. H. White (Secretary) said:—I have to announce with deep regret the decease of Mr. Edward William Stephens, Fellow, of Maidstone, and also of M. Jules Louis André, Hon. Corresponding Member, of Paris. M. André died on January 30, and he was buried to-day. He was a member of the Institute of France in the Section of Architecture of the Academy of Fine Arts, also a member of the Société Centrale, and architect of the Museum of Natural History in Paris, a Professor of the School of Fine Arts, a Commander of the Legion of Honour, and was also perhaps most distinguished as the master of many hundreds of pupils.

The Royal Gold Medal, 1890.

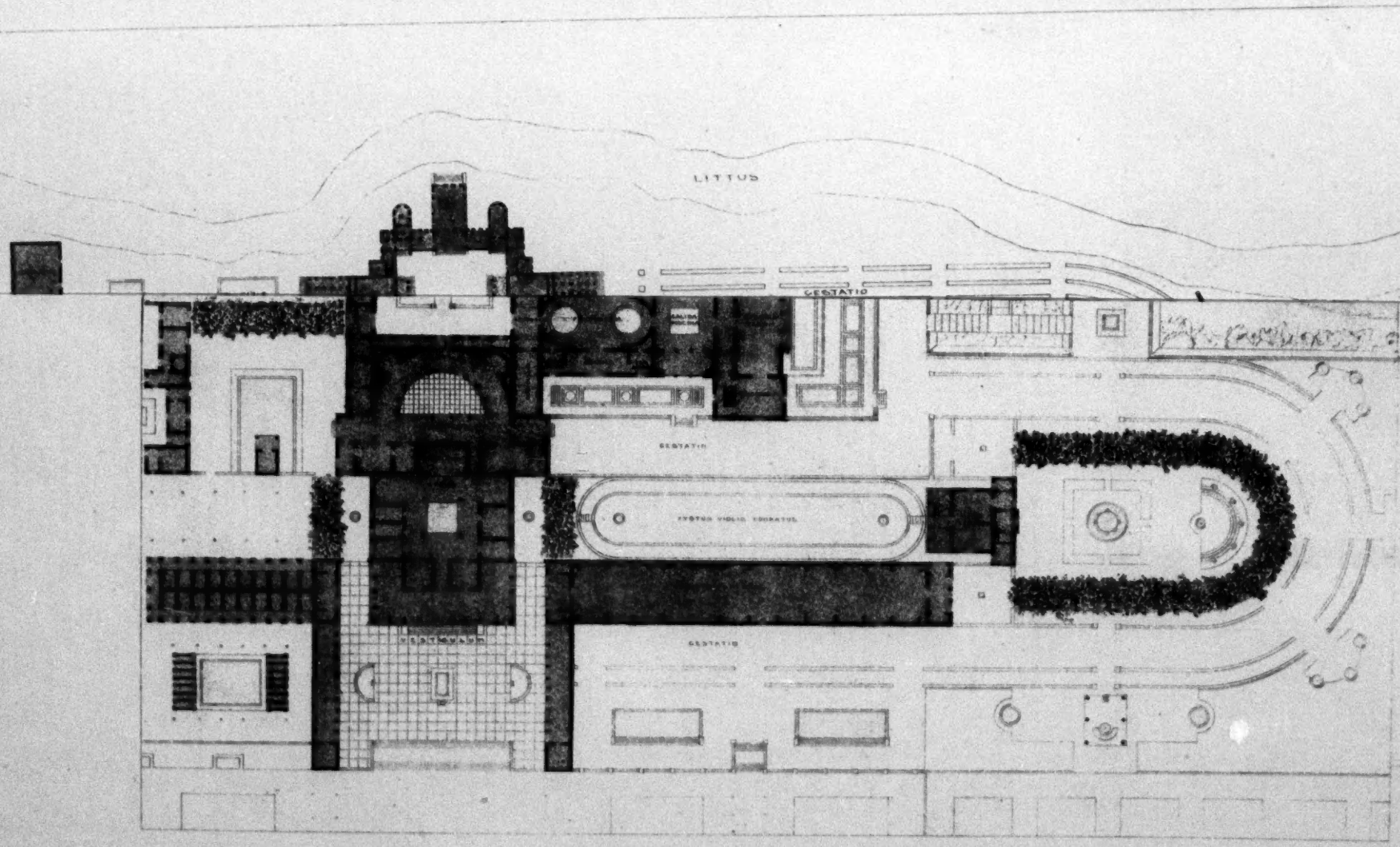
The Secretary having read By-law No. 64, relating to the award of the Royal Gold Medal,

The Chairman said:—I have now to announce that the Council propose to submit to her Majesty the Queen the name of John Gibson, past Vice-President, as the recipient of the Royal Gold Medal for the current year, for his works as an architect.

The Renaissance in Northamptonshire.

Mr. J. Alfred Gotch then read a paper, entitled "The Renaissance in Northamptonshire." The author, in his opening remarks, referred to the influence of Italy in the middle of the sixteenth century on the arts and literature of England, but considered that up to the third quarter of the century the Tudor style of architecture still reigned supreme. About 1550 to 1560 the new forms were universally adopted, and the comparative quietude of the age, and the great wealth of many ministers and courtiers of Elizabeth, enabled them to build mansions in which to establish themselves and their posterity. Lord Burghley, Sir Christopher Hatton, and Sir Thomas Tresham were the most illustrious builders in Northamptonshire. The capricious way in which the details of the period varied in excellence was most striking. Side by side, so to speak, might be found work the most delicate and refined, and work the most coarse and clumsy; but there was no gradual growth and decadence, no possibility of assigning a date to the work by slight changes in the detail or modification of the mouldings. In Northamptonshire, however, the work was of more even excellence, and, on the whole, of more intrinsic merit, than that of any other district with which the author was acquainted. Although one John Norden, in his "Delineation of Northamptonshire," in 1610, enumerated some fifty seats of noblemen and squires, there now only remained about ten for him to refer to, some having entirely disappeared and others being completely modernised. The first described by Mr. Gotch was Dingley Hall, built about 1558, which still retained some notable specimens of the early Renaissance, the work of Edward Griffin, Attorney-General to Queen Mary, who not only made use of most eccentric mouldings, but adorned his work with highly curious inscriptions, of which examples were quoted. Burghley House was next dealt with, and letters written by workpeople at Burghley to Sir William Cecil in London referred to, which, in common with others relating to Holdenby House, Hatfield House, and Cobham Hall, threw some light on methods of procedure connected with building in that era. The workpeople appeared to have applied direct to the owners for instructions; of the architect, as such, not a word was mentioned. A surveyor was here and there spoken of as going to inspect the works, but he was not always the same man. The owner apparently arranged everything and furnished the drawings, the carrying-out of which was entrusted to a foreman or clerk of works, who hired the workmen on behalf of his master. The details seemed to have been generally left to the fancy of the various artificers, who probably carried out the small scale drawings according to their own lights, though occasionally requests were met with for full details, which in some cases appeared to have been supplied by Thorpe, John Shute, Henryck, and others. Mr. Gotch then gave quotations from letters addressed to Sir William Cecil from the mason, foreman, and others at Burghley, and having alluded to Wothorpe, the Dower-House at Burghley, which was built about 1600, proceeded to describe Sir Christopher Hatton's palace at Holdenby, and quoted the commendations of Lord Burghley and Sir Thomas Heneage upon it. Turning next to Sir Christopher's purchase of Kirby Hall, Mr. Gotch thought there could be no doubt that the whole of the main building was built by the Staffords, and from Thorpe's plan it was known that he laid the first stone in 1570, and the work appeared to have gone on until 1575, while subsequent to 1580 various extensions took place. Fifty years later, under Inigo Jones, another and the last period of active building set in, and fortunately the judicious care of the present owner was preventing Kirby, as far as possible, from falling into the same state as Holdenby. Reference was then made to John Thorpe's connexion with the building of Kirby Hall, Burghley, and Holdenby, and also to his plans of Lyveden New Building, which was built for Sir Thomas Tresham, who presented to the town of Rothwell a new market-house, which, however, was never finished, and had never had a roof. It was in some respects a typical Elizabethan building, and though its detail was coarse, yet it could not be denied that the whole composition had the merit of vigour and piquancy. Having remarked upon the chequered life of Sir Thomas Tresham, reference was made by the author to the Triangular Lodge, Rushton Hall, and the Lyveden New Building, which were all about the same date, the last two being described in considerable detail. Mr. Gotch considered Tresham's work more severe than that of his successors, the Cokaynes. His gables were straight, theirs were many of them curved, and all his architectural work was simple, elegant, and suggestive. Apethorpe Hall, one of the most striking specimens of Renaissance in the county, was next described, and its similarity to Rushton pointed out. At Lilford, a few miles from Oundle, was a fine example of the circular bay, but there was something in the stiff arrangement of the windows that told of the tame slavery to which architecture in England was about to succumb. At Drayton House was a veritable storehouse of architecture, from walls and gateways of the Edwards, to pediments and panelling of William III. One wing was dated 1584, and the exterior still proclaimed its date; the principal interest, however, lay in the vaulted cellars, which a close inspection showed to be vaulting of the days of Elizabeth. Rockingham Castle was enlarged in similar manner to Drayton House, and was well worthy of inspection. Turning to the southern part of the county there was not much Renaissance, but Canons Ashby and Castle Ashby could not be omitted. The former was a beautiful old house, presenting work of the end of the fifteenth, the end of the sixteenth, and the beginning of the eighteenth centuries. Castle Ashby was begun about 1583, and the bay windows of that time were easily recognised, while the fine entrance screen was the work of Inigo Jones, dated 1624. The Renaissance impressed itself not only on the great houses; every kind of building was touched, from the palace of Holdenby to the little cottages of Brigstock and Geddington, and the author considered there were few districts in England where more suggestive features could be found for stone treatment. Having alluded to the almshouses at Weekley, Mr. Gotch, in conclusion, said the style was the outcome of a fascinating period. All England was quivering with vitality; when Dingley was built, Spenser was six years old; when Thorpe laid the first stone of Kirby, Shakspeare was the same age;

PLINY'S LAURENTINE VILLA

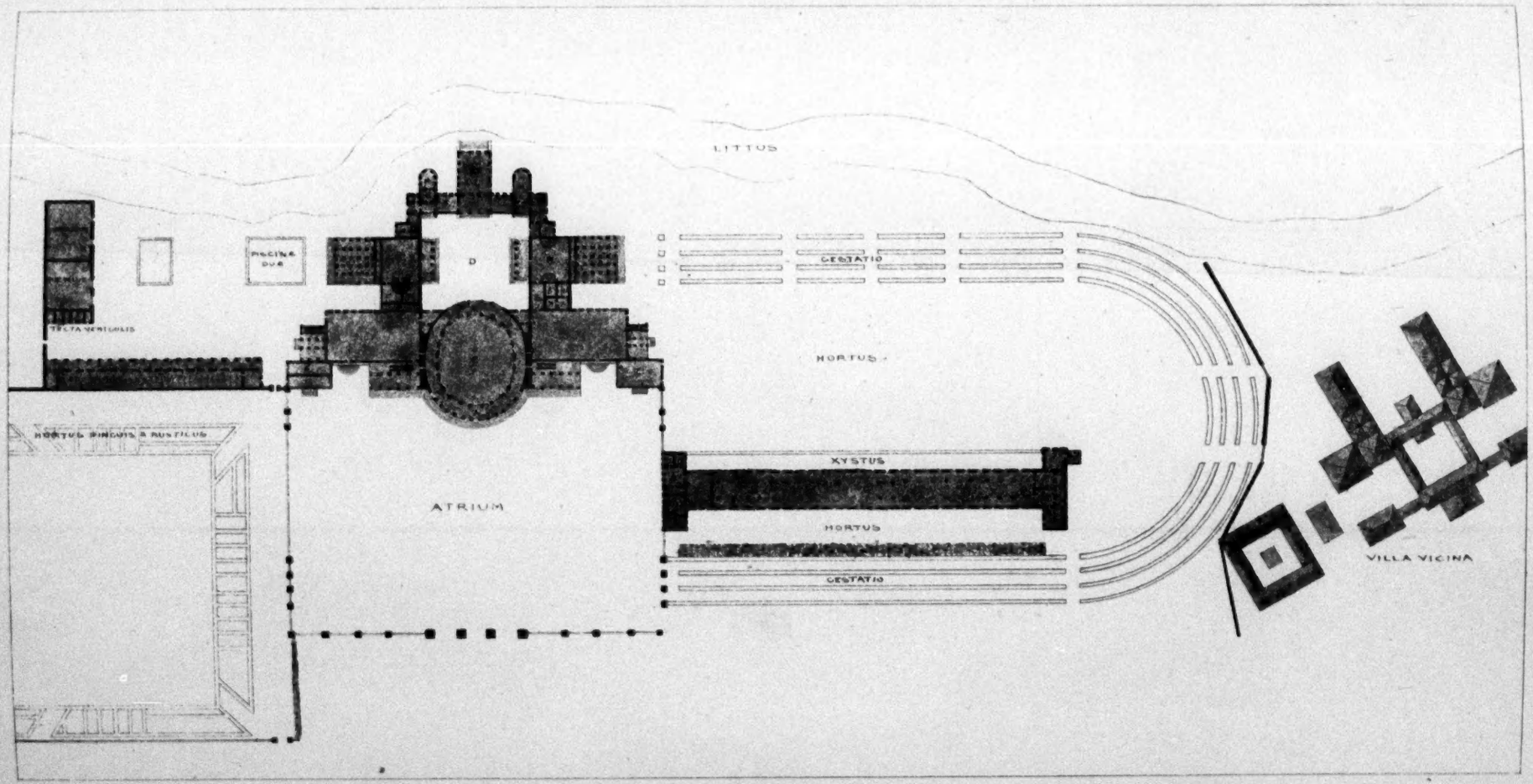


RESTORED BY BOVCHET. 1852.

INK PHOTO. SPRAGUE & Co. 27, ST. MARTIN'S LANE, ARNOLD ST. LONDON, E.

ILLUSTRATIONS TO SECOND ROYAL ACADEMY LECTURE ON ARCHITECTURE,
By Professor Aitchison, A.R.A.; January 30th, 1890.

PLINY'S LAURENTINE VILLA

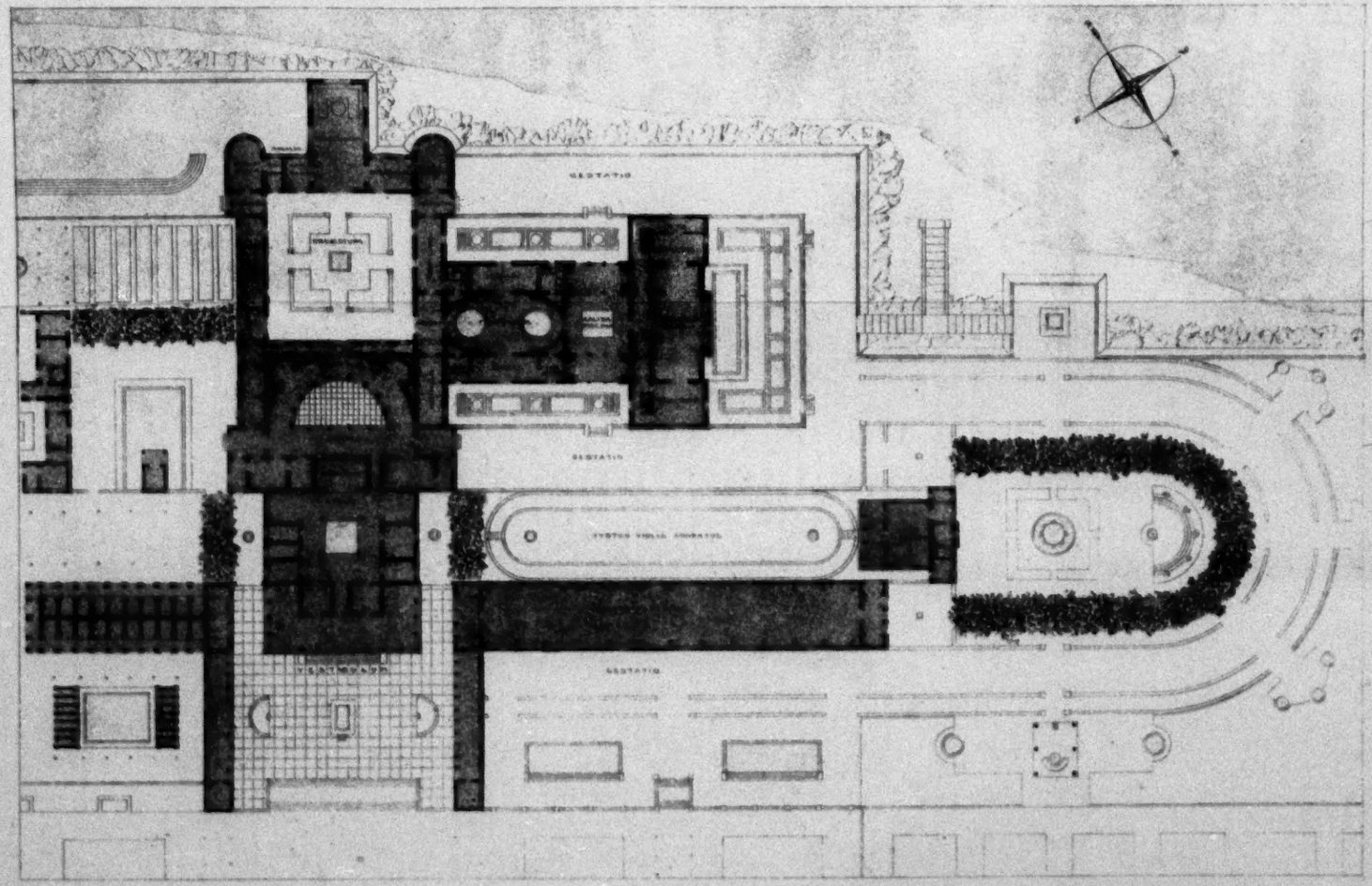


RESTORED BY R CASTELL 1728

A	VESTIBULUM	F	CUBICULUM AMPLUM	K	DORMITORIUM MEMBRUM	P	CUBm ALIUD	U	PROPNIGEON	m	CELLÆ LIBERTORUM	f	ERGASTULUM		
B	PORTICUS	G	CUBICULUM MINUS	L	CUBm POLITISSIMUM	Q	PROCÆTON	W	BAPTISTERIA DUO	b	CULINA	g	CELLA VINARIA		
C	AREA	H	CUBICULUM IN APSIDA	M	CÆNATIO	R	CELLA FRIGIDARIA	X	DUÆ CELLÆ	c	CORTINALE	h	CELLA OLEARIA		
D	CAVÆDIUM		CURVATUM	N	CUBICULUM	S	UNCTUARIUM	Y	SPHÆRISTERIUM	d	FURNUS				
E	TRICLINIUM	I	TRANSITUS	O	PROCÆTON	T	HYPOCAUSTON	Z	TRICLINIUM	e	CARNARIUM				

a	Xystus tecta a mari	e	Zotheca
b	Diæta Duæ	f	Cubicula tecta
c	Cryptoporticus	g	Andron
d	Heliocaminus	h	Diæta alia
		i	Cubiculum

b	Ducta Aqua	f	Cubicula duplicia
c	Cryptoporticus	g	Andron
d	Heliocaminus	h	Proscenion

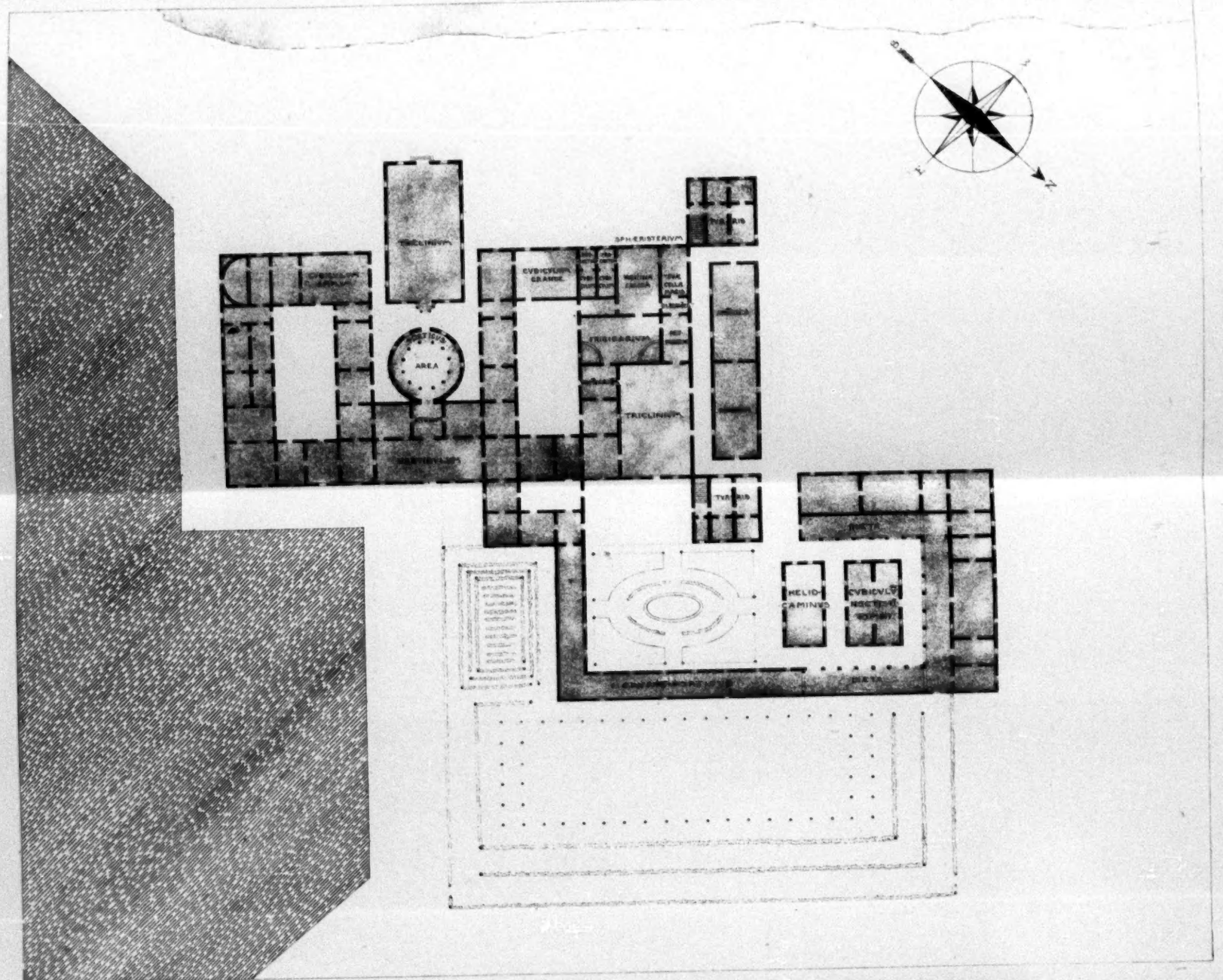


RESTORED BY BOVCHET. 1852.

ILLUSTRATIONS TO SECOND ROYAL ACADEMY LECTURE ON ARCHITECTURE,

By Professor Aitchison, A.R.A.; January 30th, 1890.

PLINY'S VILLA AT LAVRENTVM.



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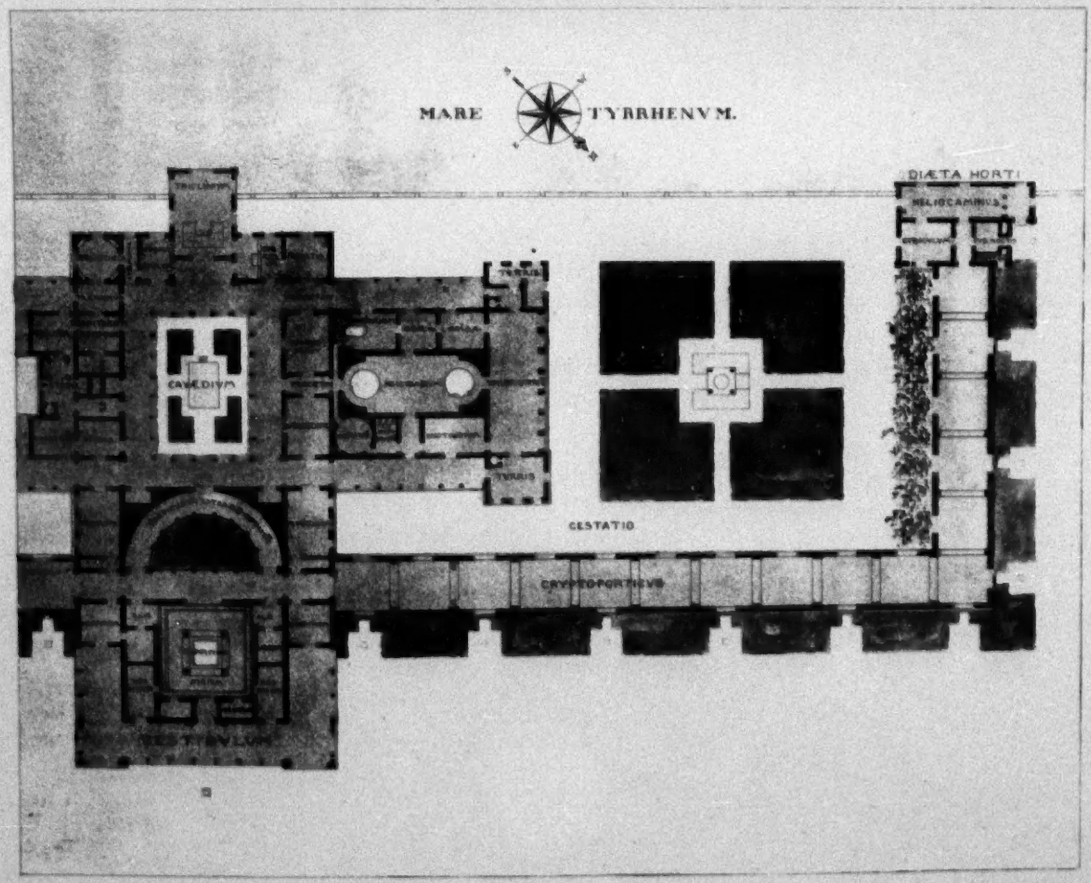


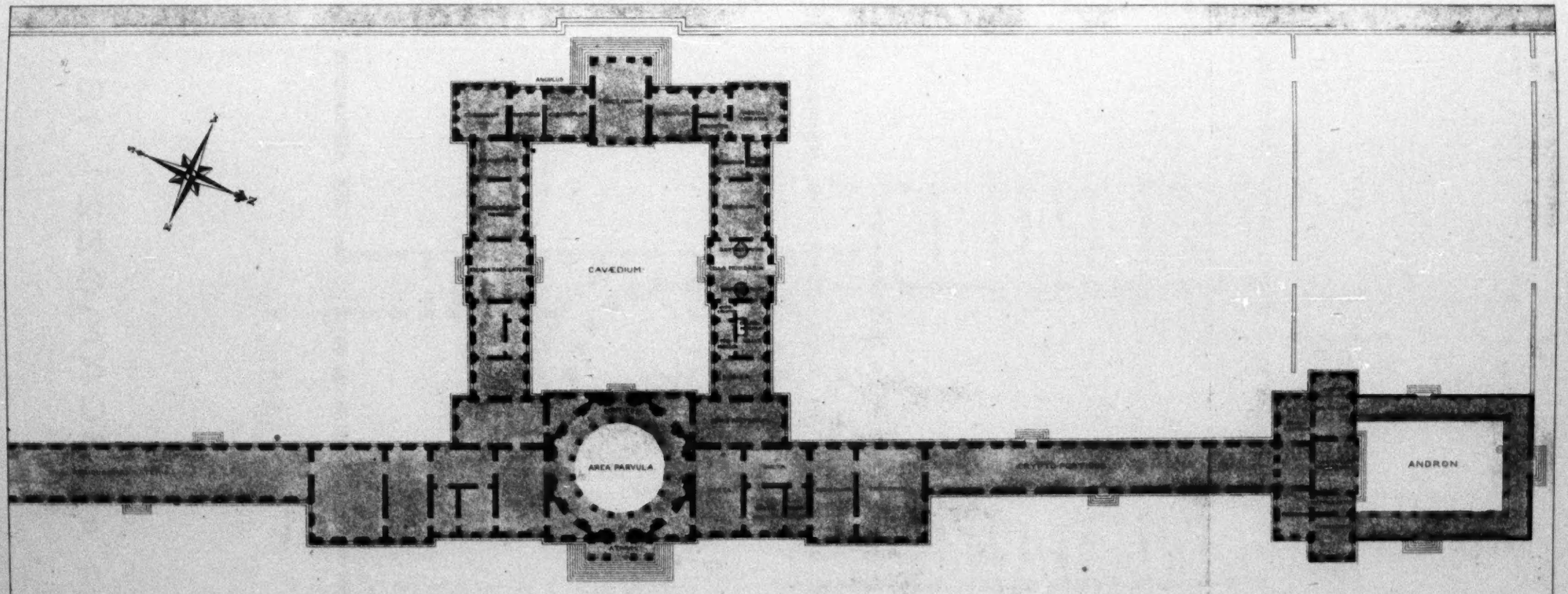
RESTORED BY HAVDEBOVRT. 1838.

ILLUSTRATIONS TO SECOND ROYAL ACADEMY LECTURE ON ARCHITECTURE,
By Professor Aitchison, A.R.A.: January 30th, 1890.

Bronze Statue of Victory
Museo Brescia
IGH 30. Sept. 1887.

DRAWN BY MR. GERALD C. HORSLEY, A.R.I.B.A.

PHOTO-LITHO. SPRAGUE & Co., 62, MARTINS LANE, CANNON ST. LONDON, E.C.



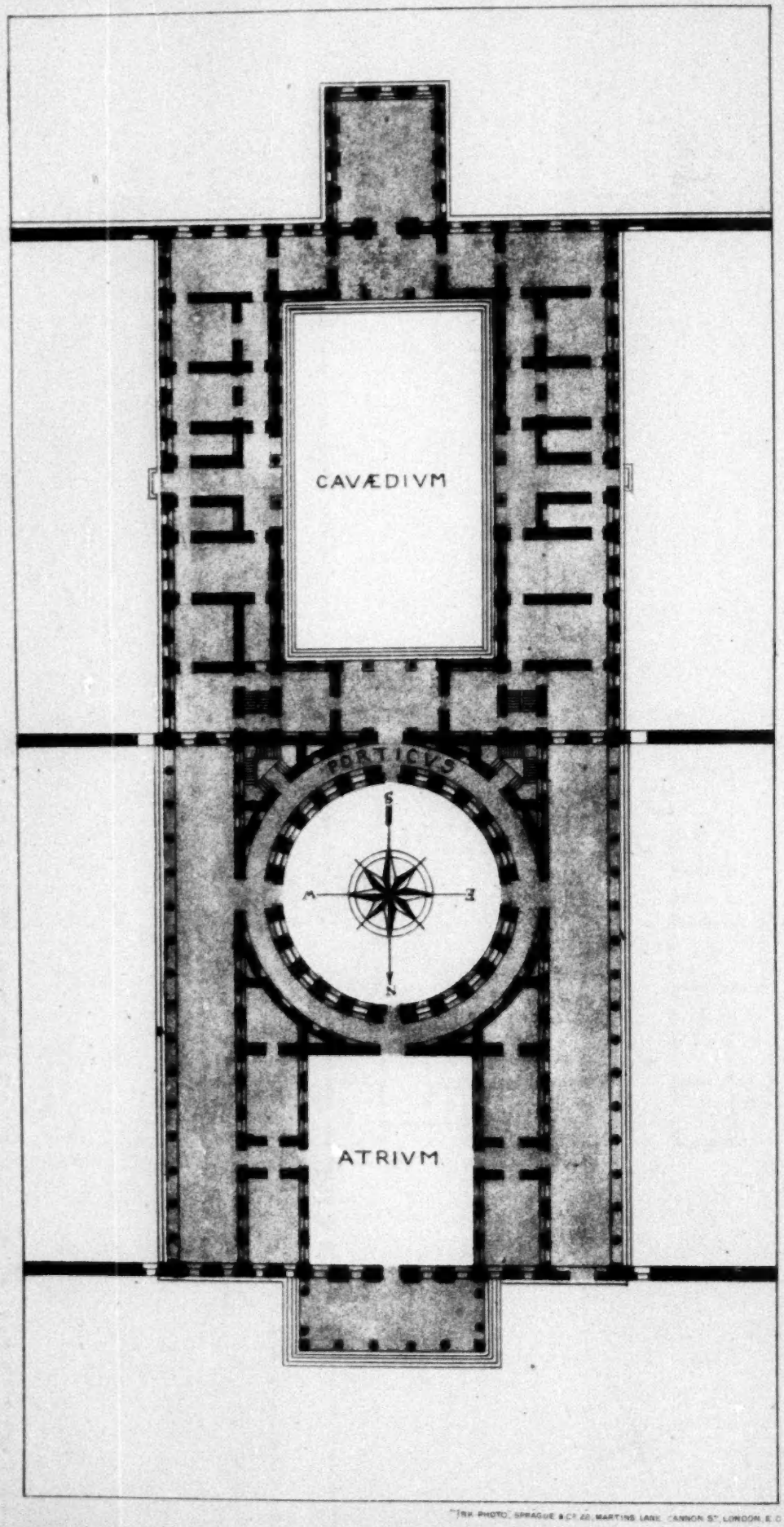
PLINY'S VILLA AT LAVRENTVM – RESTORED BY FELIBIEN DES AVAVX·1699·

"IRIS PHOTO" SPRAGUE & Co. 62 MARTINS LANE, CANNON ST. LONDON, E.C.

ILLUSTRATIONS TO SECOND ROYAL ACADEMY LECTURE ON ARCHITECTURE.

By Professor Aitchison, A.R.A.; January 30th, 1890.

PLINY'S VILLA AT LAVRENTVM.



"[illegible] PHOTO," SPRAGUE & Co., 62, MARTINS LANE, CANNON ST., LONDON, E.C.

RESTORED BY SCAMOZZI. 1615.

ILLUSTRATIONS TO SECOND ROYAL ACADEMY LECTURE ON ARCHITECTURE,
BY PROFESSOR AITCHISON, A.R.A.; JANUARY 30TH, 1890.

when Lilford was rising above the Nene, Ben Jonson was still alive; while, between the stoppage of Rothwell Market-house and the beginning of the Triangular Lodge, the great Armada was shattered. It was no wonder that the architecture of the time was interesting. Into the stones of their houses the men of Elizabeth's time hewed their greatness and their simplicity.

The paper was copiously illustrated by lantern views and plans of the buildings referred to.

Mr. Wyatt Papworth proposed a vote of thanks to Mr. Gotch, who, he said, had certainly given the members great enlightenment on the subject of his paper. They all knew the interest which he (Mr. Papworth) had taken in the subject of the introduction of Renaissance architecture into England. The difficulty had always been to know who were the persons employed. His own impression, from the researches he had made, was that a great deal of the work of those buildings was done by the local masons. The County of Northampton contained a large number of good stone quarries, and the masons who wrought the stone apparently came of families who inherited considerable taste in the use of the material. He had been rather more strongly impressed with that view after reading Professor Willis's and Mr. Clark's History of Cambridge. He found that there was the old family of Grimbold, who did a good deal of the work of the Colleges, who apparently settled at Cambridge and became contracting architects. The buildings shown by Mr. Gotch seemed to convey some traditional work of the Early Tudor period, continued later down even through the transitional period of the introduction of Renaissance architecture. They were still in the dark as to how the Italian work came into England, and Mr. Gotch had scarcely touched upon that matter. It was known that John Shute was sent over by the Duke of Northumberland to Italy to study architecture. Unfortunately, however, he died a year or two after he published his interesting and scarce book; but although his epitaph stated he had erected a number of buildings, we did not know the name of a single one, and that was the misfortune with so many of those architects. It had been for a long time matter of doubt as to whether such a person as John Thorpe ever really existed. His book in the Soane Museum, from which Mr. Gotch had copied some of the plans that had been shown on the screen, was well known; but whether Thorpe designed or sketched the buildings referred to there was great uncertainty; in fact, there was not a single record connecting his name with these valuable buildings. He (the speaker) had been able to discover a few records connected with Crown Lands, which Mr. Gotch was in possession of. There was one curious point which he had come upon lately, and that was the finding out where John Thorpe had lived, and almost where he died. In looking into an old volume of the *Builder*—one of his fine old bottles of crusted port—he found a reference by Peter Cunningham to a work by Pecham. In hunting that up, he found there was a family of the name of Thorpe who were surveyors, and lived in St. Martin's-in-the-Fields. From the context it was evident there was a father and a son, and if that was the case, it threw them into the difficulty as to which of the two designed the buildings. Having searched the registers of St. Martin's-in-the-Fields from about 1600 to 1624, he found three Thorpes. In 1618,—a rather peculiar date from other circumstances,—the burial of John "*Thropes*" was registered, and the question was whether this was their John Thorpe. He also came across a book called "The Northampton and Rutland Wills of 1570 to 1602," and looking through the index of that he found the names of various Thorpes; while in 1566 there appeared the name of Ann Thrope, of Oakham, which would rather confirm the suggestion he had made that "Thorpe" and "Thrope" were the same name. As to the word "trick," which had been mentioned, it was an old expression for a drawing, while the word "plat" was the same as the present word "plan." He thanked Mr. Gotch for the very interesting, elaborate, and entertaining paper he had read, and hoped that some of their friends might take up the other counties, and illustrate them in the same way. If that were done, they might then get a very interesting idea of a most important part of the history of architecture in England.

Mr. Ralph Nevill, F.S.A., seconded the resolution, and referred to the excellent views of the buildings which had been given on the screen. It was evident that the subject was deeply implanted in Mr. Gotch's brain, and the only complaint that he had to make was that the lecturer had not described more fully the insides of the buildings, which were, in some respects, more interesting than the exteriors. To many, the woodwork and interior fittings of that period were far more interesting than the exteriors. Few, if any, of the buildings they had seen that evening could really be regarded as very fine specimens of architecture, and that led him to the consideration of the point Mr. Gotch had brought forward, as to how they became designed. The first indication of the style came to England in the time of Henry VIII., who was an extravagant builder of palaces. There were records in the Bodleian Library that in particular the joiners engaged on works in the period under review had mostly Italian and French names, which proved conclusively that they were brought over to this country, and no doubt introduced the new style. The early woodwork and the mantel-pieces in the good houses were obviously the work of cultured and skilled people, and it was only in small things, and at later times, that rude copies were to be found. When those skilled workmen had died out their successors produced rude and rough carving, which was infinitely inferior to the early work. Although some of these looked nice enough, it was due to the colour which age had given them. At Kirby nobody could recommend the use of the pilasters, nor other Classic features of the design, although the cornices and details were as exquisite as need be. It was left to the masons to carry out the details to the best of their ability, and these were men who were perfectly able by tradition to carry out the ornament, though they were not able to carry out any grander scheme. He believed that might account in some way for certain failures that were to be seen. Wherever buildings of a humbler aspect were to be found, and where there was a greater mixture of the old style, there would be found greater skill, as at Rushden and other Tudor outsides. Mr. Gotch had spoken about the survival of mullions, but in stone counties these had lived to an even later date than he had mentioned. He (the speaker) had seen them in Gloucestershire, and he was not sure, as a matter of fact, that they had ever died out, although the fashionable large houses had gone in entirely for sash windows. No doubt the style in Northamptonshire had been introduced by the great courtiers, who become possessors there, and that was the case everywhere. The proprietors throughout England in those days were nearly always non-resident, and where the court influence was not felt the old style lived on very much longer than where they had so thorough a disturbance as took place in the home counties, in which some of the new style of work was produced somewhat in advance of the date Mr. Gotch had given. It seemed to him in all these things that the workman's skill was considerably in advance of the general designer's, until at a later date, when such men as Inigo Jones went to Italy and really studied architecture at first hand. He thought that there were many other parts of England where the larger buildings, though not more important, were in a sense more graceful and correct than some of those that had been shown to them that evening. It was, however, a great boon to them all that such a work as Mr. Gotch had engaged in should be taken up, and the buildings commemorated while there was still time. As they had seen from the photographs, many of the structures were going fast to ruin, and if some of the enthusiastic architects scattered about the country turned their attention to this work they would be able to lay up a treasure which future generations would highly appreciate.

The Chairman suggested that Mr. Nevill himself should take a step in that direction, by preparing an appendix containing extracts from the archives of the Bodleian Library.

Mr. Nevill replied that he had not the time, but perhaps Mr. Bruton, of Oxford, who was present that evening, might be able to undertake the work.

Mr. E. G. Bruton, F.S.A., expressed the pleasure he had felt in listening to Mr. Gotch's lecture and in witnessing the views. He was afraid there was no chance of his being able to carry out what Mr. Nevill had suggested, as the work he had to do rendered it impossible. With regard to the similarity of the Northamptonshire buildings to those in Oxford, he could not find from his knowledge of the Oxford work that they were familiar to him. There was a very different feeling to be found in the Oxford buildings from what they found in the buildings of Northamptonshire. It would be interesting to compare them, and if they could collect the names of the persons who did the work in those days, it might lead to some interesting discoveries.

Mr. S. Flint Clarkson suggested that the drawings known as "John Thorpe's" had been made by the actual designer of the buildings, as they showed the flues on the upper floors in several cases.

Mr. H. D. Appleton said that it had occurred to him whether the person who ordered the inscription "God save the King, 1560," quoted by Mr. Gotch, was not an old lawyer. Some two or three years ago, when Lord Coleridge took the chair at a King's College annual dinner, he took exception to the toast of "The Church and Queen," saying it should be "The Church and King." The head of the State, Lord Coleridge then maintained, was always a king, even if a woman were sitting on the throne. We always spoke of "the United Kingdom."

Mr. Brydon remarked that much of the work in Northamptonshire which had been referred to was the outcome of the revival of learning which made its way into England, bringing its architecture with it. At the same time, there was a vigour about the whole work, and a distinctive national character, which marked it out as worthy of study. The builders of those days were a most vigorous race, and the result was a strength of detail and character in the work. His only regret was that Mr. Gotch had not taken them inside some of the houses. The plaster-work was very fine all through that period, and there was an exuberance about the detail that was very characteristic. He often wondered why so many of the young men of the present day rushed off to foreign countries when they had at their own doors such excellent English work to study, and which was so full of suggestion to the architect.

Mr. Paul Waterhouse drew attention to the light that was thrown upon the architecture of the period by contemporary painting, and he instanced two pictures in the Tudor Exhibition among several containing architectural backgrounds.

The vote of thanks was then put, and very heartily received.

Mr. Gotch, in reply, said that the reason he had not given more views of the insides of the houses was the difficulty of getting good photographs of interiors, and the fact that the houses he had referred to had not much inside them worth being photographed. At the same time, he agreed with the idea that inside the houses architects could get as many suggestions as from the outside. With regard to Oxford, it had been said that the work there was very like the work in Northamptonshire, but it had always struck him that the obloquy which was heaped on the work of the period by the advocates of the Gothic style some thirty years ago, and notably by the late Mr. J. H. Parker, was occasioned by the Renaissance work which that gentleman saw round him in Oxford. It certainly struck him (the speaker) that the Oxford work, on the whole, was not anything like so interesting and suggestive as the work in Northamptonshire, although there was a family likeness. The materials of Lyveden were in great part removed to Oundle. Some of these remained on the ground, and his attention was called to them last year, when, under a heap of nettles, a mass of stones was pointed out. These the agent caused to be turned over, and upon some of them were found details with the trefoil and the Tresham coat of arms, but no date. Mr. Clarkson's suggestion that what were called Thorpe's drawings must have been made by the designer of the buildings, because they showed the course of the flues, was ingenious, and a good deal of weight might be attached to it. One suggestion was that he was simply a surveyor measuring the buildings for the owners, and that might be the case in some respects, but the opinion he had come to from a very careful inspection of the plans was that they might see in it the work of the designer as it came from the mind. It was proposed that Oundle Market House should have a roof put upon it, but that was waiting for want of funds, and any gentleman who felt interested in the subject could not do better than contribute to the building fund. With regard to the Tudor

Exhibition, he thought it was discreditable to the promoters that there was not a single reference to or illustration of architecture, as an art, to be found in it.

The Chairman intimated that the next meeting would be held on the 17th inst., when a paper will be read by Mr. John Slater on "Building Legislation."

The proceedings then terminated.

THE LONDON COUNTY COUNCIL.

THE ordinary weekly meeting of this Council was held on Tuesday afternoon last, in the Council Chamber of the Corporation of London, Guildhall. Sir John Lubbock, Vice-Chairman, occupied the chair in the absence of the Chairman, Lord Rosebery, who was unable to be present.

Resignation of the newly-elected Chief Engineer.—The Chairman said he regretted to have to announce that he had received a letter from Mr. Clement Dunscombe, resigning the office of Chief Engineer, to which he was elected only a short time ago.* In answer to a question from Councillor Torr, the Chairman said that Mr. Dunscombe's letter could be read, if the Council wished, but the resignation was tendered entirely on the ground of ill-health. After some discussion, it was decided to refer to the Standing Committee, in conjunction with the Chairmen of those Committees which were concerned with engineering work (such as the Main Drainage Committee and the Bridges Committee), the question of selecting a successor. With so many candidates for the office recently before the Council, it was decided not to re-advertise for candidates.

Election of an Assistant Engineer.—The Standing Committee brought up the following report and recommendation:—"We have to report that, in accordance with the directions given by the Council on the 3rd of December, an advertisement was issued inviting applications for the appointment of Assistant Engineer, in the place of Mr. Lovick, at a salary of 600*l.* a year. These applications were referred in the first instance to the Main Drainage Committee, with a request that that Committee would advise us as to the three candidates who might appear to them the most suitable for the post. The total number of applications received was 67, but this number was reduced, by setting aside the applications of candidates who had had no experience in the drainage of towns and in the service of municipal bodies, to 44. Of this latter number, 12 were seen by the Main Drainage Committee, who selected Mr. W. S. Crimp, Mr. H. A. Roechling, and Mr. A. B. Allan, as in their opinion the most suitable. In submitting these candidates to us the Committee stated that they had put the names in the order of what appeared to them the relative suitability of the three candidates for the office. The three gentlemen thus selected have since appeared before us, and we have done our best, by inquiry into their previous experience and the work they have been engaged upon, to form a judgment as to their respective merits. In doing so we have paid great deference to the opinion of the Main Drainage Committee, but we have not found ourselves able to agree altogether with the conclusion arrived at by that Committee. We cannot help feeling that they have very naturally dwelt mainly upon the special requirements of their own department; and we are of opinion that we should most faithfully carry out our opinion in the matter, and best serve the general interests of the Council, by submitting the names of Messrs. Crimp and Allan, without indicating any preference between them. We accordingly recommend—

"That the Council do select either Mr. A. B. Allan or Mr. W. S. Crimp for the vacant office of Assistant Engineer, and that the appointment be made on the conditions set forth in the minutes of the Council of 3rd December, 1889."

This recommendation gave rise to some discussion on the merits of the two candidates named, and on a show of hands being taken the numbers were: For Mr. W. Santo Crimp, 44; for Mr. Allan, 39. A division being demanded and taken, there were: For Mr. Crimp, 47; for Mr. Allan, 46. Mr. Crimp was therefore declared elected.

The Main Drainage Question. — The Main Drainage Committee reported as follows:—"In accordance with the resolution of the Council of December 17, 1889,† instructing the Main Drainage Committee to secure the 'services of an eminent Civil Engineer to join the Engineer of the Council in a thorough examination of the whole sewage system; and that the Engineers be desired to include in their report an approximate estimate of the cost of taking the whole of the sewage to sea,' your Committee have obtained from Mr. Benjamin Baker his consent so to act with the Engineer of the Council, his fee to be a retaining-fee of fifty guineas, and fifteen guineas per day occupied, the whole not to exceed 500 guineas. Your Committee recommend that this arrangement be approved."

This was agreed to without discussion.

The Flushers' Wages.—On the recommendation of the same Committee it was agreed—

"That the wages of flushers at Barking be at the rate of 7d. an hour, the work to be arranged in shifts of eight hours, in consequence of the work having to be continued throughout the twenty-four hours, with half an hour allowed for refreshment, the men to be booted ready for work at the hour of starting; that the work be carried on, as far as practicable, continuously throughout the week, and that the number of men employed be no more than the number sufficient to deal with the amount of sludge which under existing circumstances can be carried out to sea."

After transacting some further business the Council adjourned, after sitting for more than four hours.

* Dec. 3 last. See *Builder* for Dec. 7, p. 404.
† See *Builder*, Dec. 21 last, p. 446.

THE INSTITUTE OF BUILDERS.

THE sixth annual general meeting of this Institute was held at the offices on the 4th instant, Mr. F. May, J.P., in the chair.

The Secretary, Mr. Richard S. Henshaw, read the following report:—

"1. In presenting their Sixth Annual Report, the Council are pleased to be able to state that there is an increase in the number of members of the Institute, though they regret to have to record the loss by death of Mr. H. C. Lansdown.

2. Several Bills relating to the Building Trade came before Parliament during the Session, and were carefully watched by the Parliamentary Committee, and where considered desirable, necessary action was taken.

3. It will be remembered that the Council in their last Report had appointed a Committee to confer with the Surveyors' Institution, in consequence of the legal decision in the case of Priestley *v.* Stone. The Committee, consisting of Messrs. H. T. Ashby, S. G. Bird, and Frank May, after considerable correspondence, succeeded in obtaining an interview with an equal number of gentlemen representing the Surveyors' Institution, and after some discussion it was thought desirable by the representatives of both Societies that the number should be increased to *nine* on each side. The Representatives then consisted of—

Builders.	
Mr. H. T. Ashby.	Mr. F. J. Dove.
,, H. H. Bartlett.	,, A. J. Mansfield.
,, S. G. Bird.	,, Frank May.
,, J. T. Chappell.	,, J. Randall.
,, J. H. Colls.	
Surveyors.	
Mr. C. B. Arding.	Mr. C. J. Shoppee.
,, T. C. Clarke.	,, H. T. Steward.
,, C. J. Mann.	,, W. H. Strudwick.
,, T. M. Rickman.	,, F. G. Widnell.
,, C. F. Selby.	

4. The powers granted to the Committee by the Council of this Institute were:—

'To consider the responsibility of Quantity Surveyors for their quantities and matters incidental to the preparation and compilation of Bills and Quantities and Specifications, or arising thereout, especially as regards provisional amounts and work and the employment of specified firms for goods or work.'

5. The Committee placed their views before the representatives of the Surveyors' Institution, but after considerable discussion the representatives of the Surveyors did not see their way to recommend the members of their Institution to accept any legal responsibility for their work, and after further discussion the subject was, on the proposition of the Surveyors, adjourned *sine die*.

6. In the early part of the year Mr. G. S. Stevens, the Past-President, and Mr. G. Watson, a member of the Directorate of the National Association of Builders of America, visited this country. Several interviews took place between them and several members of this Institute, and it is hoped that the interchange of information and ideas may lead to the mutual benefit of both societies and to a further extension of courtesies. They were entertained at dinner by some of the London builders.

7. The Council have made a grant of 25*l.* to the Library Fund from the funds of the Institute, and they also have to express their thanks to the Royal Institute of British Architects and the National Association of Builders of America, and other friends, for the presentation of books, &c.

8. In addition to the usual grants from the Benevolent Fund to the Builders' Benevolent Institution, the Builders' Clerks' Benevolent Institution, and the Provident Institution of Builders' Foremen and Clerks of Works, the Council have also had the pleasure of granting some assistance to two private applicants.

9. The Council have to announce that in future, instead of making an annual grant to the Builders' Benevolent Institution, they have made arrangements for the support of one pensioner to be selected by them from the list of candidates approved by the Builders' Benevolent Institution.

10. Permission, during the pleasure of the Council, has been granted to the Home Counties' Volunteer Institution to use the rooms of this Institute for meetings, when not required for other purposes.

11. The Council have to tender their thanks to Mr. Joseph Randall for the paper read by him at the Institute, which they considered of great interest and value.

12. Under the Articles of Association, no provision is made for retaining Past-Presidents upon the Council and benefitting by their experience and advice.

13. Under these circumstances the Council wish the members to consider the desirability of altering the Articles of Association to the extent of making all Past-Presidents Honorary Vice-Presidents.

14. In accordance with the Articles of Association, the President, Mr. Frank May; one of the Vice-Presidents, Mr. R. J. Waller; the Treasurer, Mr. George Plucknett; one of the Auditors, Mr. H. I. Sanders; and four members of the Council, Mr. James Greenwood, Mr. Woodman Hill, Mr. Robert Neill, junr., Mr. J. H. Trollope, retire, but are eligible for re-election."

On the motion of the Chairman, the report was received and adopted, and

Mr. Thomas F. Rider was unanimously elected President for the ensuing year. Mr. R. J. Waller was elected, and Mr. A. J. Mansfield was re-elected, to the office of Vice-President. Mr. George Plucknett, J.P., was re-elected Treasurer; Mr. Frank May was elected a Member of the Council, in the place of Mr. A. J. Mansfield; and the following members were elected and re-elected on the Council, viz.:—Mr. John M. Burt, Mr. Woodman Hill, Mr. Robert Neill, junr., and Mr. J. H. Trollope. Mr. H. J. Sanders was re-elected one of the auditors.

A vote of thanks to the Chairman concluded the proceedings.

THE SOCIETY OF ENGINEERS:

THE PRESIDENT'S ADDRESS.

THE first ordinary meeting of the Society of Engineers for the present year was held on Monday evening, February 3, at the Town Hall, Westminster. Mr. Jonathan R. Baillie, the President for 1889, first occupied the chair, and presented the premiums of books awarded for papers read during his year of office, viz.:—The "President's Premium" to Mr. G. M. Lawford for his paper on "Fireproof Floors." The "Bessemer Premium" to Mr. Samuel Griffin for his paper on "Modern Gas-engine Practice." A "Society's Premium" to Mr. Henry Faija for his paper on "Forced Filtration of Water through Concrete," and to Mr. George R. Strachan for his paper on "The Construction and Repair of Roads."

Mr. Baillie introduced the President for the present year, Mr. Henry Adams, to the meeting, and retired from the chair, receiving a hearty and unanimous vote of thanks for his services during the past year.

Mr. Adams then took the chair, and proceeded to deliver his inaugural address. He briefly alluded to the satisfactory position of the Society, which now numbers 417 members of all classes, and mentioned the loss by death of Dr. Percy, and the addition of Earl Granville, Lord Armstrong, Lord Brassey, Sir Wm. Thomson, Mr. Wm. Anderson, and Mr. Benjamin Baker to the roll of honorary members. He commented on the principal points of the papers read during the session, and described the features of interest in the works visited by the members during the vacation, which included the East London Waterworks, the Sewage Outfall Precipitation Works at Crossness, the Central Station of the London Electric Supply Corporation, and the Foreign Cattle Market, Deptford. The President then referred to the progress of technical education, noticing particularly the work of the Science and Art Department and that of the City and Guilds of London Institute, and incidentally gave some particulars of the City of London College, where he has been for twenty-one years the Professor of Engineering. Remarking that a wider field of enterprise than that contained within the shores of the United Kingdom was necessary for engineers, he gave statistics showing that about 30 per cent. of the English engineers were now practising abroad. The extended use of mild steel and some of its disadvantages were noticed, and the President then passed on to a consideration of our fuel supply. He believed that the days of coal were surely numbered, and that it behoved us to seek other means of generating power, and in the meantime to practise the greatest economy in the use of the mainstay of England's prosperity. Under the head of railways some figures were given showing the vastness of the traffic upon them, and that, notwithstanding the rapidity of transit, according to the last statistics only one passenger was injured in

1½ millions, and not more than one in 80 millions was killed by causes beyond their own control. Several large bridges were described, the Forth Bridge, of course, occupying the place of honour, and references were made to many other engineering works and processes which have occupied public attention. In conclusion, attention was directed to the necessity for specialisation in the studies of engineers, the multifarious sub-divisions rendering it physically impossible for one man to thoroughly master more than one or two branches, and hence the necessity for the existence of such bodies as the Society of Engineers, where experiences could be freely exchanged.

NATIONAL ASSOCIATION OF MASTER BUILDERS OF GREAT BRITAIN.

THE twenty fourth half-yearly meeting of this Association was held on Wednesday, January 29, at the rooms of the Central Association of Master Builders of London, Bedford-street, Strand, London; Mr. J. Howard Colls, President, in the chair; and local Associations were represented by master builders from London, Manchester, Liverpool, Birmingham, Leeds, Hull, Bristol, Southampton, Gosport, and Bolton.

The report and accounts for the past half-year were discussed and adopted.

The demands made by the operatives in Birmingham, Blackburn, Bradford, Dundee, Edinburgh and Leith, Glasgow, Hamilton, Leeds, Liverpool, Birkenhead, Norwich, Rochdale, and Southport, were fully discussed.

From Bristol, the representative reported that the amicable relations there existing are maintained by meetings of the workmen with a committee of the Builders' Association, and that mutual concessions will conduce to the same end.

The question of any alterations in the Employers' Liability Bill was fully discussed, also insuring for any alteration that may be made in the Act. The Steam Engine and Boiler on Land (Person in Charge) Bill was also discussed.

The Council reported that the Association is keeping up correspondence with the National Association of Master Builders of the United States of America, which by a curious coincidence held its meeeting on the same day, at St. Paul's, in Minnesota.

It was decided to hold the next meeting in Southampton.

In the evening the members of the Association dined together.

ASSOCIATION OF PUBLIC SANITARY INSPECTORS OF GREAT BRITAIN.

THE seventh annual dinner of this Association was held on Saturday evening last at the First Avenue Hotel, Holborn. Dr. B. W. Richardson presided, and among the company present, in all one hundred persons, were Dr. R. Farquharson, M.P., Surgeon-General C. A. Gordon, the Mayor of Leamington, Mr. E. C. Robins, Mr. Banister Fletcher (Master of the Carpenters' Company), Dr. Danford Thomas, Dr. Dudfield, Mr. Hugh Alexander (Chairman of the Council), Mr. Stanton Wm. Preston, Mr. C. W. Raymond, and Mr. S. C. Legg (hon. sec).

In giving the toast of "The Association and its President, Sir Edwin Chadwick," Dr. Richardson gave a sketch of the history of the society. When the Medical Officers of Health were first appointed, it was asked on all sides where the assistants of these medical officers would come from, and when they were found what would they be called. Assistants were found at last, though considerable difficulty was experienced in getting competent men for the work; and the name of sanitary inspectors was fixed upon. Though the first race of inspectors was largely untutored, now that a generation had passed away they had learned their duties and understood the importance of them; and having found by experience that union is strength, the Association was formed in 1883. Its formation he considered to be the triumph of honest work, honourably conceived. The duties of the Association were to teach and protect its members—to teach them how their tasks should be carried out, and to protect them in the execution of them. Every sanitary inspector throughout the country, said the speaker, ought to belong to it; and he hoped that the apathy at present shown by too many of them would not last any longer. But there was something more to which the Association ought to turn its attention, and that was provision for the future. The British public was taking a decided stand on the subject of pensions, and he believed that in a few years' time there would be no such things as pensions for officials holding public offices. The Association should now take upon itself the duties of a provident society, and insure its members against the evils of an unprovided old age. Referring to Sir Edwin Chadwick, who had been the President of the Association since its formation, Dr. Richardson said that the record of the work he had done was written in the history of the century. Though brought up for the Bar, with great abilities in that direction, he had lent himself to new and simpler work. For a period of over sixty years he had continued to spread sanitary light in England; and had made sanitation what it never could have been if he had not lived to be its guide, philosopher, and friend.

At the conclusion of his speech the chairman presented to Mr. S. C. Legg, the honorary secretary of the Association, an illuminated address and a purse of gold on behalf of the members, and in recognition of his ability and services. Other toasts followed, including that of "The Executive," proposed by Mr. S. F. Murphy, Medical Officer to the London County Council.

ROYAL ACADEMY LECTURES.

SIR,—In my first Royal Academy lecture, published in your issue of the 1st inst., I said, "The Koptic architect who built the brick mosque for Touloun in the ninth century . . . . *possibly* was the introducer of the small arches that take the place of pendentives in the dome." My friend, Mr. R. Phené Spiers, has pointed out that these arches are not coeval with the original mosque.

Mr. Stanley Lane-Poole, in his "Art of the Saracens in Egypt," says of the brick dome, at page 54, "It was built, however, a century later than the mosque itself;" and at page 64, "There is such a cupola over the niche in Ibn-Tulun, and though this is probably of the date of the restoration by Lagin in 1296, to judge by the wooden stalactites, which are found in no other part of this mosque. GEORGE AITCHISON.

150, Harley-street, W., Feb. 4, 1890.

THE LONDON SEWAGE QUESTION.

SIR,—In the discussion at the Society of Arts upon Sir Robert Rawlinson's paper, Mr. W. C. Sillar spoke to the effect that if the effluent or water from the A B C process was good enough to go into the Thames above Teddington Lock, it was surely good enough to go into the same river at Barking Creek, or into the Clyde at Glasgow.

Now, as I understood Mr. Sillar to state, when here, that the amount of the Kingston-on-Thames sewage effluent in dry weather is only about a million and a quarter of gallons daily, while the flow of the Thames there amounted to about four hundred millions of gallons daily, it follows that the Kingston effluent only amounts to about one part in 325 of the Thames water. Moreover, the flow of the Thames is continually carrying away this effluent. The circumstances here are quite different from those either at London or Glasgow, for in the former the sewage effluent rises up to about one-third of the flow of the Thames, while at Glasgow in dry weather the effluent is equal to about half the amount of the flow of the Clyde. In dry weather, also, there is no sensible flow of the river seawards from the harbour as the tide comes up past Glasgow. In these circumstances no proper comparison can be drawn between the effect of the small quantity of sewage effluent at Kingston and the large amount at both London and Glasgow,—in the latter case about 50,000,000 gallons daily, which we have been told would produce 44,000 tons of sludge a year, which sludge is calculated to realize (on paper at least) £22,000 a year, at 10s. a ton. I observe Mr. Clare Sewell Read stating that "the actual sludge, after it was dried, would not answer the purpose of any farmer to carry it four or five miles." The yearly Glasgow sewage revenue (if anything) might, therefore, really be only 22,000 farthings, not pounds sterling.

W. P. BUCHAN.

CARY'S GRAVE.

SIR,—In your interesting note on Hogarth House, Chiswick, occurs the sentence:—"In this same house died, in 1844, Cary, the translator of Dante; who, as also Hogarth and his wife, was buried in Chiswick churchyard." This statement is hardly correct as it stands, from the fact that Cary is not buried in Chiswick churchyard, but in Westminster Abbey.

As your journal is not the first publication wherein I have seen this erroneous assertion respecting Cary's place of sepulture, perhaps I may not be considered out of place if I ask the writer of the paragraph to state his authority in this instance.

The *Athenæum* of August 24, 1844, contained an obituary notice of Cary, from which I quote the following words:—"Mr. Cary well deserved the place in Poet's Corner, in Westminster Abbey, which on Wednesday last was granted to his remains." His grave is next to that of the poet Campbell, and from the slab which covers it I have copied the following inscription:—

UNDERNEATH
LIE THE REMAINS OF
HENRY FRANCIS CARY, M.A.
VICAR OF ABBOTS BROMLEY
FORMERLY VICAR OF KINGSBURY WARWICK
TRANSLATOR OF DANTE
BORN DEC. 6 1772
DIED AUG. 14 1844

I am, Sir, yours &c., JOHN T. PAGE.

*** We are obliged to Mr. Page for preventing the further circulation of a mistake. Our authority was Thornbury & Walford's "Old and New London," vol. vi:—"Carey [*sic*], the translator of Dante, resided at Chiswick, in Hogarth's house, and lies buried in the churchyard, close under the south wall of the chancel. His monument was a few years ago rescued from oblivion, and restored at the expense of the vicar, who carefully enclosed it with iron railings."

THE SHEFFIELD MUNICIPAL BUILDINGS COMPETITION.

SIR,—Kindly correct a mistake which appeared in your issue of the 25th ult.

In reviewing the plans exhibited at Sheffield of competitors for the Municipal Buildings you mention one by Messrs. Dunn, Hansom, & Dunn. This, as it stands, is incorrect, as my name should have been added, but through an oversight, probably of the clerk employed to label the designs, it has not appeared. The plans were drawn up by Messrs. Dunn, Hansom, and Dunn in conjunction with myself, and, I may add, were executed entirely in our Bristol office.

I shall be much obliged if you will let this letter appear, in order to remove misconceptions.

FREDK. BLIGH BOND.

Liverpool Chambers, Corn-street, Bristol.
February 3, 1890.

CHURCH BUILDING NEWS.

Eastham, Tenbury.—The Church of SS. Peter and Paul at Eastham, Tenbury, Worcestershire, in the diocese of Hereford, was re-opened on Thursday, Jan. 23rd, after undergoing a complete restoration of the nave. The fabric is of Norman work dating from 1080 to 1120, with some insertions in the north and south walls of the fourteenth and fifteenth centuries. The southern doorway, a beautiful specimen of Norman architecture, now opened for re-use, was blocked up in 1831, and the chancel arch, of similar design, was then destroyed, through some mistaken zeal. Above the southern doorway is some well-preserved wall arcading with intersecting arches, a rare example, in that position, of the change of style or period of transition. The restoration has been carried out as a memorial to the late George Browne, M.A., Q.C., formerly Recorder of Ludlow, by his widow, and his brother, the Rev. Henry Browne, rector of Eastham. Nash, in his History of Worcestershire, says:—"From the mention of a Presbyter in the Domesday survey of this Manor here was a church in the Saxon Age." The architect for the restoration was Mr. H. Hardwicke Langston, of London; the works have been executed by local tradesmen, Mr. Hill and Mr. Hurds; Mr. John Kaye, of Camberwell, supplied the new stonework.

Fire Drill in Schools.—*Apropos* of the disaster at the Forest Gate Schools, upon which we commented a fortnight ago (see *Builder*, p. 55, *ante*), Messrs. Merryweather & Sons write to say that the Warehousemen and Clerks' Schools, at Russell Hill, Caterham, were two years ago fitted up by them with hydrants and other fire-extinguishing apparatus. With these appliances the boys are periodically drilled. The executive of the schools at Russell Hill were amongst the first to acknowledge the value of fire-drills, which, while assisting in the healthy development of muscle, is likely be of service to the boys and to the country in after life. Many of these boys will go into city warehouses, and will take with them the knowledge which comparatively few people possess—viz., "how to act in case of fire," should necessity arise, much to the benefit of their employers. The question of fire-drill was mentioned at the inquest which was held on the lamentable disaster at Forest Gate, the jury strongly advising a periodical drill with the fire apparatus; and we trust that this recommendation will not be lost upon those who are interested in the management of our large schools.

The Student's Column.

ELECTRICITY, MAGNETISM, AND ELECTRICITY SUPPLY.—VI.

MAGNETISM.

If a wire is wound into a spiral or helix, fig. 10, and a current sent through it, a set of lines of force is formed by the combination of the circular lines produced round every point in the wire; these resultant lines run through the helix parallel with its axis and curve back through the air outside. The coil or helix being closely wound with insulated wire, experiments show that the shape of the external field produced by the current is the same as it would be if the space occupied by the helix were filled by a piece of steel uniformly magnetised. A piece of soft iron, so made as to just fit the interior of the coil, inserted into it increases enormously the strength of the field, but does not alter its shape; the external effects are the same as they would be on increasing the strength of the current. It is, of course, impossible to map out the paths of the lines of force within the mass of metal, but there is no reason for supposing the shape of the field they form is essentially different from that traced out in the air within it by the helix alone.

It is a remarkable fact, and one of extreme importance, that if a piece of steel be taken and cut so that its edge follows exactly the curve or curves traced by a wire carrying an electric current, and if, furthermore, it be magnetised so that the direction of magnetisation at every point is the same as that of the line of force produced by the current alone; then the magnet so formed produces a field precisely similar to the one produced by the current; indeed, the magnet may be substituted for the voltaic circuit, and *vice versâ*.

This interchangeability of magnet and circuit leads us at once to Ampère's theory of magnetism. In what has been said about magnets no attempt has been made to explain the magnetisation of the ultimate molecule of a piece of iron or steel. Ampère supposed that around every molecule of a magnet there flows an electric current. As a permanent magnet does not get hot nor require a constant supply of energy furnished to it in order that it may maintain its magnetised state, this theory also leads to the assumption that in each molecule there is at least one path that offers no resistance to the flow of electricity.

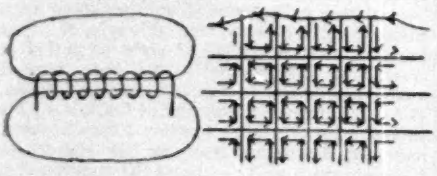


Fig 10. Fig 11.

Suppose fig. 11 to represent a slice of steel, one molecule thick, cut from the north end of a steel magnet. The squares are individual molecules with their equal currents flowing round them. It will be seen from the figure that the external effect of each part of the current in an internal molecule must be neutralised by the current flowing in the opposite direction in that part of the neighbour with which it is in contact, although the direction of the current in each individual molecule is the same, viz., opposite to that of the hands of a watch; this process of neutralisation goes on everywhere except at the periphery of the slice, that is at the surface of the magnet where there consequently exist unneutralised portions of molecular currents all flowing in the same direction.

This collection of currents in the surface of a steel magnet is equivalent to a current flowing in a wire similarly shaped, and hence it is that a suitably-shaped and magnetised piece of steel can produce the external effects of a voltaic circuit, or *vice versâ*. Together with what has been written under "Magnets," the above completes the theory of magnetism as far as the magnet itself is concerned. Briefly, each molecule of a magnet has an electric current whirling round within it; when the metal composing the magnet is in a neutral or "unmagnetised" state, the axes of these whirls form closed curves within the mass of the metal; when the metal is magnetised, these whirls of current are arranged so that their axes emerge from the metal into the surrounding medium.

But a magnet is of practical use only by virtue of the field of force in the air or other medium surrounding it, and the nature of the lines of force making up this field must be considered.

Fig. 12.

Fig. 12 has already been used to show the relative directions of an electric current A B, and the circular lines of force enveloping it. The electricity in the conductor can move bodily forward in the direction of the arrow; but the electricity outside is entangled or bound together so that it is incapable of such motion of translation. At the surface of the conductor the particles of electricity in the stream rub against those outside, and the lines of force are due to this rubbing.

A rough idea of what is likely to happen may be got by standing on the bank of a river and looking at the water near the edge of the stream; the water is prevented by the friction of the banks from moving forward readily with the main current, and a number of little eddies or whirlpools are formed whose axes of rotation are at right-angles to the direction of flow of the main body of water.

In the case of the electric current, the electricity outside the conductor cannot move forward at all, it can only spin round; hence in fig. 13, if A B is the current, it will set the particles of electricity at its surface spinning round in the direction of the arrow δ, and these will cause the similar rotation of the particles beyond them, the axes of rotation of the particles forming closed rings round the conductor. A line of force, then, is simply an axis around which electricity is rotating. In fig. 13, D is the direction of the current, d the direction of the line of force, δ the direction of rotation of the electricity surrounding the conductor.

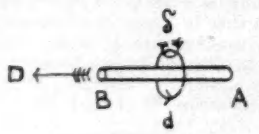


Fig 13

Fig. 12 can, without any alteration, be made to show the relative directions of current and line of force in two distinct cases. (1) If A B is an electric current, then the circles show the shape and direction of lines of force. (2) If the circles represent conductors carrying currents of electricity, then A B shows in shape and direction a line of force passing through them. The diagram in the latter case is of use in connection with electro-magnets. Ampère's rule, already given, may be written so as to include both cases:—"If you stand in a $\left\{\begin{matrix}\text{current}\\\text{line of force}\end{matrix}\right\}$ which goes from your feet to your head and look at a $\left\{\begin{matrix}\text{line of force}\\\text{current}\end{matrix}\right\}$ it is directed towards your left hand."

Labour and Wages in China.—According to some recent United States Consular reports, in Hong Kong, Chinese workmen get from 12*l.* 5*s.* per annum, with board and lodging. Mechanics without board are paid per day:—Blacksmiths, 1*s.* 8*d.* to 4*s.* 2*d*; bricklayers, 1*s.* 3*d.* to 1*s.* 8*d.*; carpenters and joiners, 10*d.* to 2*s.* 1*d.*; masons, 1*s.* 3*d.* to 1*s.* 8*d.*; labourers, 10*d.* and upwards. In the district of Ningpo the rates of wages are, for

Blacksmiths	per month	£1	0 10
Bricklayers	per day		0 10
Carpenters	,,		0 11
Coppersmiths	,,		1 3
Gold and silver workers	,,	10½ to	1 8
Painters	,,		0 10½
Plumbers	,,		1 0

Wages have not increased here for years, and strikes never occur. Trouble is rarely experienced, as labourers are confined to the districts in which they are employed. No labourer is allowed to be employed outside of his district; he may by general consent join the labourers of another district—not otherwise.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

2,741, Door Springs and Checks. G. F. Newman.

By the apparatus which is the subject of this patent the door is closed by a pulling action, and the closing apparatus is fixed either on the door frame or on the inside of the door. Within an upright barrel is a volute or band spring, whose inner and outer ends are connected to the inside of the barrel part and to an adjustable plate. The plate, which is rigidly connected to the central axis, lies upon the top face of the lower bracket under the barrel, while the axis, which is threaded through the spring and body part, has its end passing and working through the middle of the brackets. An arm and link aid the movement of the spring by bringing it into direct purchase. The tension of the wound-up spring causes the arm to move back, when the door is liberated, to its usual position with a pulling action to the link, and through the link to the door.

2,817, Window Sash-fasteners. W. S. Laycock.

A rack and pinion is the actuating power of the fastener which is the subject of this patent, and the catch can be operated by throwing the same in or out of gear, which can be done from inside the window, the mechanism being mounted in a suitable framing.

2,946, Brick and Tile Machines. J. Morhard.

This invention relates to machines for cutting and pressing bricks from clay. The material is first subjected to suitable pressure in a two-part separable case and by means of a revolving cutting-tool, which is caused to pass transversely through the pressed mass of material at the line of separation of the form or mould. At the time of such separation, after the pressing operation, a portion of the pressed material of suitable size to form a brick or block is smoothly cut from the end portion of the material. After this cutting operation, an elevating and discharging device receives and raises the cut-off portion clear of the form, and brings it into position to be readily taken out of the machine, and at such time the two-part form is moved in such a manner as to uncover and leave the finished block entirely clear of the form.

16,209, Windows. A. Heinrich.

The unpleasant propensity of window panes subjected to the influence of the various states of the atmosphere to be transformed into a non-transparent sweating or frozen state is, it is claimed, obviated by this invention. Two panes of glass are fitted with an air space between them, and in the frame a channel is made for carrying away moisture.

17,199, Veneer Saws. D. P. A. Mersing.

The object of this invention is to enable the veneer saws to act in both upward and downward directions. For this purpose the teeth are made M shape, and set at different angles, as in most cross-cut or wood saws.

7,109, Fireproof Partitions. A. W. Rammage.

In order to provide a partition which is fireproof and rigid, partitions are, according to this invention, made with iron or steel rods of T, L, or round or square section, and at the point of intersection they are fixed by a rivet, and the interstices are filled in with concrete, &c. Channel iron is used when necessary to aid in a better foundation for the concrete.

1,262, Blocks of Artificial Stone. A. McLean.

The artificial stone which is the subject of this patent is made of granite chippings and Portland cement. These are mixed with water and submitted to very heavy pressure. The effect of the heavy pressure is to produce on the surface a thin skin of fine cement, which is removed by rubbing down, and a very good polish is obtained. Mechanical and hydraulic means of pressure are mentioned in the specification.

3,144, Bricks. Bell & Sons.

The object of this invention is to produce bricks for building so made as to receive plugs, so that when built into a wall, woodwork or other materials may be attached thereto. To this end recesses are formed in the faces of the bricks, which, after baking, may be filled in by wood or other porous substance. The bricks are built into the wall where it is desired to secure woodwork, as, for instance, they may be built into doorways, and the door-frames secured thereto by nails or screws driven into plugs in the bricks. By this invention the fastening is rendered more secure, and the objectionable practice of driving plugs between the mortar-courses is avoided.

3,355, Wall-Tiles and Linings. W. Hubbard and Others.

According to this invention tiles are made thin and of unshrinkable material, mostly of the nature of artificial stone or siliceous substances. They are made also with rebates, grooves, or recesses, and the joints are covered by bosses, strips, or other

ornamental forms. The leading point is the unshrinkable nature of the material of which the tiles are made.

3,371, Fireplaces. H. M. Ashley.

The jambs and lintel of the fireplace are, according to this invention, made of metal, hollow, so that there is a cavity between their fronts and the wall against which they are fixed. A door is also provided, which can, when required, be turned up into a horizontal position, and a gas burner, which is usually accommodated within the chamber, can be turned down to receive over it, and under the turned-up door, a saucepan or other cooking utensil.

3,516, Windows and Window-Fastenings. A. Ferret.

In order to allow of the lower sash being drawn out, the beads are, by this invention, hung on butt hinges, and this, with a fastening by means of a spring bolt secured to the top rail of the lower sash, constitutes the novelty of the invention.

3,563, Improvements in Water-closets. H. Lord.

The improvements which are the subject of this patent consist chiefly in so arranging the cistern sideways in a line with the closet-pan, with a passage between the two, that the water in the cistern will flow into the pan to the same level as that in the cistern, an ordinary ball-tap being used to regulate the height or level of water in the cistern. A flap or clack suitably arranged hermetically seals the lower portion of the pan when the closet is not in use, but when the contents of the closet-pan are desired to be flushed to the sewer, the flap or clack is lowered by pulling a handle.

NEW APPLICATIONS FOR PATENTS.

Jan. 13.—579, W. Reynor, Staunching Defective House-drains without taking up Floors or opening Ground in Basement. 586, A. Flint, Testing House-drains. 608, J. Becker, Scaffolding.

Jan. 14.—640, A. Watson and J. Rastrick, Fire-grates. 671, A. Clark, Cutting Stone. 675, C. Stilwell and A. Thayer, Adjustable Square and Level.

Jan. 15.—711, W. Greaves, Ventilator. 723, W. Thompson, Sash-locks or Window-fasteners. 734, W. & J. Rawlings, Flushing Apparatus for W.C.'s, &c. 746, S. Fawthrop, Sash-bars and Glazing. 764, W. Barnes, Compositions to be used as Paints. 777, F. Streeter, Water Waste Preventers. 791, R. Crowden and R. Pulton, jun., Paperhangers' Roller.

Jan. 16.—802, J. Harding, Bakers' Ovens. 821, J. Bruce and others, Shop-window Fittings. 832, G. Hope, Sand Separators.

Jan. 17.—915, E. Norton, Paint-cans.—926, D. Nesbit, Radiators for Heating and Ventilating.—946, J. Radford, Securing Door-knobs to Spindles.—949, C. Sziklai, Arrangement of Door-bars.

Jan. 20.—974, E. Ingham, Draught-preventers for Doors.—985, H. Grimshaw, New White Pigment.—1,020, T. Reed, Water-taps.

Jan. 21.—1,054, J. Cormell, Fastening for Window-sashes and Doors.—1,074, W. Ellis, Machinery for Cutting Laths, Veneers, &c.—1,095, E. Smith, Veneer-cutting Machines.—1,115, T. Haas, Locking Devices for Double or Folding Doors.—1,116, N. Procter and Others, Brickmaking Machines.

Jan. 22.—1,139, G. Hurdle, Self-lubricating Pulleys for Window-sashes, &c.—1,151, C. Denbigh, Window-sashes.—1,176, W. Sinclair, Compound for Cementing Iron Rails to Kerbing, Drain-pipes, &c.—1,178, W. Sinclair, Waterproofing and Preserving Composition for Stone, Bricks, Plaster, and Cement Surfaces.—1,185, C. Hunter, Extracting Cowl.—1,190, H. Lake, Valves for Flushing-tanks or cisterns.

Jan. 23.—1,194, J. Morton, Machinery for Making Bricks, Pipes, &c.—1,248, W. Horn, Building-block.

Jan. 24.—1,272, T. and H. Moorwood, Canopied Stove-grates and Fireplaces.—1,295, C. Shaw, Flushing Apparatus for Water-closets.

Jan. 25.—1,346, W. Sugg, Ventilating Apparatus.—1,353, W. Young, Securing Sash-lines to Sashes.—1,356, A. Boult, Manufacture of Rough, Glazed, and Coloured Facing-stones.

PROVISIONAL SPECIFICATIONS ACCEPTED.

13,449, H. Lake, Saws.—14,396, C. Cavill and S. Lawrence, Window-fastener.—16,178, H. Hardy, Water-closets.—16,915, J. Margison, Door-knocker.—18,062, J. Balinforth, Securing Sash-cords.—19,782, H. Cowan, Exit-door for Theatres.—20,344, G. Rydill, Mason's Chisels, &c.—20,406, W. Lake, Cutting Veneer.—20,410, W. Cowlin, Closing Doors, &c.—20,510, R. Snapland, Timber Drying, &c.—20,833, W. May and E. Padmore, Window-fasteners.—20,843, F. Parker, Hinges.—20,848, A. Smith, Artificial Stone.—17,382, W. & J. Rhodes, Chimney Pot.—19,541, A. Palmer, Flooring of Bridges, &c.—19,814, G. Plurkett, Grate or Fire-place.—19,963, R. Reeves, Ventilation, &c.—20,207, R. Painter, Raising and Lowering Windows.—20,303, C. Smith, Artificial Asphalte.—20,342, F. Wright and T. Gillott, Flooring for Bridges, &c.—20,454, D. Hunter, Fences and Gates.—20,460, E. Joachim, Plates, &c., for Floors.—20,467, W. Tattersall, Fans or Air-propellers for Ventilation.—20,707, R. Mullard, Paints and Varnishes.—20,786, R. Hirst, Counter Flaps and Doors.—653, E. Hesketh and A. Marcet, Cooling Air in Rooms, &c.—907, M. Walker, Ventilators.—295, W. Kneen, Attaching Door-knobs to Spindles.—330, J. Dunning and B. Priestley, Sash Fasteners.—353, N. Russell, Door Springs and Checks.—392, R. Brown, Nail.—481, E. Burtwell, Bracket for Shop-window Fittings.—640, A. Watson and R. Hooper, Fire-grates.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to Opposition for Two Months.

1,577, A. Youlten, Sliding Windows.—2,862, H. Lakewater, Closets, &c.—3,741, F. Marshall, Securing Knobs and Handles to Spindles.—3,970, E. Matheson, Tiles.—4,730, W. Townsend, Wind-guard Chimney-pots.—4,946, R. Clunes, Bricks.—4,947, R. Clunes, Pipes.—5,068, R. Blyth, Sash-fastener.—5,378, H. Levetus, Door Springs or Checks.—14,004, B. Nienhaus and J. Gaetcke, Controlling House Doors, &c.—19,259, W. Wheatley, Hasp-lock.—19,368, H. Horn and J. Effinger, Rule and Protractor.—19,427, E. Winchester, Door Latches.—19,744, G. Marsden, Tiles, &c.—20,097, C. Douglas and E. Smith, Saws.—20,294, O. Imray, Fireproof Structures.—2,134, H. Enoch, Water-closets.—4,524, C. Shewbrooks, Roof Covering.—4,895, J. Marks, Fasteners for Doors.—4,913, C. Elliott, Glazing, Fixing Sheets of Slate, Metal, &c.—4,957, W. Lindsay, Bridges.—4,958, W. Lindsay, Sash-bars.—5,083, W. Dunn, Water-closets.—6,152, W. Williams, Ventilator.—6,507, R. Evered, Door Bolts.—16,201, W. Sayer, Air Propellers.—17,560, L. Adams, Cisterns.—18,911, P. De Kristoffovitch, Artificial Granite.—19,551, J. Crane and W. Windle, Bench-plane.—20,452, G. Hayes, Metallic Lathing.

RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

JAN. 27.—By J. JACOBS & SONS.

Brompton—22, Michael's-grove, u.t. 37 yrs., g.r. £10, r. £100 p.a.	£905
The lease of 24, Michael's-grove, u.t. 12½ yrs. r. £110	110
44 and 46, Fulham-road, and 1a, Pelham-st., u.t. 23 yrs., g.r. £16	1,150

By H. HOOPER.

Edmonton—34, Graham-rd., u.t. 80 yrs., g.r. £4, r. £28. 12s.	110

JAN. 28.—By DEBENHAM, TEWSON, & CO.

Holborn—29, Ely-pl., f., area 1,426 feet	3,500
Bishopsgate-st. Within—No. 18, area 1,860 ft., let for 81 years at £1,060 per annum.	

By T. B. WESTACOTT.

Camden Town—78, Arlington-rd., f.	850
Kentish Town-rd.—No. 280, f., r. £85 p.a.	1,105

By W. J. NEWELL.

Peckham—46, Claude-rd., u.t. 60 yrs., g.r. £5, r. £26	210
Camberwell—50 and 52, Blake's-rd., u.t. 77 yrs., g.r. £7. 10s., r. £44	240
Rotherhithe—1 to 8, Fisher's-court, u.t. 47 yrs., g.r. £32, r. £93. 12s.	20

By FURBER, PRICE, & FURBER.

Eastbourne—F.g.r. of £230, with Reversion in 79 yrs.	5,550

JAN. 30.—By E. ROBINS & HINE.

Notting-hill—9, Ladbrooke-grove, u.t. 34 yrs., g.r. £4	295

By NEWBON & HARDING.

Islington—8 and 10, Brooksby-st., u.t. 19 yrs., g.r. £10. 10s.	335
2, Bath-place, f., r. £23. 8s.	155
3 to 6, and 9, 10, and 11, Bath-pl., f., r. £140. 8s.	1,080
Camden-rd.—53, Hartham-rd, u.t. 66 yrs., g.r. £7.	370
Wood-green, Truro-rd.—"Belmont Villa," f.	340

By E. STIMSON.

Camberwell—45 to 51 (odd) Hollington-st., u.t. 76 yrs., g.r. £16	200
61 to 79 (odd) Westmacott-st., and 65, Brisbane-st., u.t. 94 yrs., g.r. £42, r. £266	1,000
Walworth—36, Heygate-st., u.t. 72 yrs., g.r. £5, r. £34	385
Bermondsey—10 and 12, Fort-rd, u.t. 34 yrs., g.r. £6. 8s. 9d., r. £62. 8s.	465

By A. H. TURNER & CO.

Oatlands-pk.—F. house and shop, r. £40	395
Two f. houses, with shops, r. £65	1,225

JAN. 31.—By R. REID.

Hanover-sq.—1, Princes-st., u.t. 30 yrs., g.r. £60, r. £170 p.a.	2,025

[*Contractions used in these lists.*—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; yd. for yard, &c.]

New Harbours in Germany.—The German Government has decided upon constructing two new harbours in Schleswig-Holstein, viz., at Husum, on the south-west coast of Schleswig, and at Aarösund, in the Little Belt.

MEETINGS.

SATURDAY, FEBRUARY 8.

Architectural Association.—Visit to Mr. D'Oyly Carte's Theatre, Shaftesbury-avenue.

MONDAY, FEBRUARY 10.

Royal Academy.—Professor Aitchison, A.R.A., on "The Private Houses and Palaces of the Romans." III. 8 p.m.

Surveyors' Institution.—Mr. G. M. Freeman on "Some Suggested Amendments in the Law and Practice of Compensation." 8 p.m.

Society of Arts (Cantor Lectures).—Mr. Silvanus P. Thompson, D.Sc., on "The Electro-magnet." IV. 8 p.m.

Clerks of Works' Association.—Seventh Annual Dinner, Holborn Restaurant. 6.30 p.m.

TUESDAY, FEBRUARY 11.

Institution of Civil Engineers.—Further discussion on Mr. W. H. Wheeler's paper on "Bars at the Mouths of Tidal Estuaries." 8 p.m.

Society of Arts (Applied Arts Section).—Mr. W. R. Lethaby on "Cast Iron and its Treatment for Artistic Purposes." 8 p.m.

WEDNESDAY, FEBRUARY 12.

Sanitary Institute.—Mr. Keith D. Young, F.R.I.B.A., on "Dwellings for the Labouring Classes." 8 p.m.

Free Lectures to Artisans and others on Matters Connected with Building.—Professor T. Roger Smith, on "Drawing: Geometrical and Perspective," Carpenters' Hall, London-wall. 8 p.m.

Society of Arts.—Mr. G. Findlay (General Manager of the London and North-Western Railway) on "Modern Improvements in Facilities for Railway Travelling." 8 p.m.

THURSDAY, FEBRUARY 13.

Royal Academy.—Professor Aitchison, A.R.A., on "The Private Houses and Palaces of the Romans." IV. 8 p.m.

Institute of Builders.—Mr. T. M. Rickman, F.S.A., on "An Edinburgh Contract." 8 p.m.

Institution of Civil Engineers.—Students' visit to the Telegraph Department, General Post Office, St. Martin's-le-Grand.

Institution of Electrical Engineers.—Mr. J. Swinburne on "The Theory of Armature Reaction in Dynamos and Motors." 8 p.m.

FRIDAY, FEBRUARY 14.

Architectural Association.—Mr. R. Elsey Smith on "Some Typical Greek Buildings." 7.30 p.m.

Royal Institution.—Professor J. A. Fleming, M.A., D.Sc., on "Problems in the Physics of an Electric Lamp." 9 p.m.

SATURDAY, FEBRUARY 15.

Royal Institution.—The Right Hon. Lord Rayleigh, M.A., F.R.S., on "Electricity and Magnetism." I. 3 p.m.

Miscellanea.

Improvements in Rome.—According to a recent report of the British Consul at Rome, the Municipality of that city has, during the last seven years, undertaken an expenditure upon works of public improvement, governmental and municipal, of 11,000,000*l.*, the larger part, 9,800,000*l.*, being for works of a municipal character, comprising bridges, markets, new quarters, new streets, sewerage, water supply, &c. Of this expenditure 80 per cent. is represented by the indemnities paid for expropriation of houses and land. The demolition of old houses, and other works, have been proceeded with regularly. The works connected with the Tiber embankment proceed steadily, in accordance with the approved plans. The compressed air "caissons" are still made use of in laying down the foundations of the embankment, having proved very successful. The construction of the huge sewers proceeds in the same regular manner as the embankment. The sewers are to branch off in various directions, thus forming a general system of sewerage, placed at a considerable depth under the streets, and flushed by abundant streams of water. The Anglo-Roman Company for the illumination of Rome by gas and other systems, who have also undertaken the supply of electric light, intend utilising the hydraulic power which can be obtained at Tivoli, twenty miles from Rome, and to transmit the electric power thence, so as to illuminate Rome on a much larger scale than at present. The company will set up at Tivoli the necessary apparatus so as to obtain 1,700-horse power (electric). The current will be transmitted by overhead wires to a receiving station at Porta Pia. From there the electric light will be distributed by two systems—an overhead for public, and an underground for private illumination. The copper wires to be used for the overhead system are to be provided by the Società Metallurgica Italiana of Leghorn. The enterprise is to be completed within sixteen months, and is considered the most extensive application of the latest improvement for transmitting electric power to great distances.

Art Exhibition in Stockholm.—An art exhibition is to be opened in Stockholm, in March next, under the auspices of the Swedish Society of Arts.

St. Paul's Ecclesiological Society.—The eleventh annual report of this Society, which was presented to the annual meeting, held on Saturday last, says that the proceedings of the past year have been very satisfactory. The papers read at the evening meetings have been of great interest, and the visits, with one exception, have been very largely attended. During the year ten meetings have been held in the Chapter House, and the following papers have been read:—Two by Mr. A. Oliver, one on "Monumental Brasses and their Details," and one on "Flemish Brasses in England;" by the Rev. Ernest Geldart, on "Transepts"; by the Rev. E. S. Dewick, on "Christian Art on Coins from the time of Constantine the Great"; two, by Mr. G. H. Birch, on "Round Churches"; by the Rev. H. Hamilton Kelly, entitled, "A Study of Precedents for Liturgical Developments"; by Dr. J. Wickham Legg, on "The Divine Service in the Sixteenth Century, illustrated by the Reform of the Breviary of the Humiliati in 1548"; and by Mr. F. Hamilton Jackson, on "Mural Decoration in Churches"; and on one evening members were invited to bring for exhibition, and to describe, objects of ecclesiological interest. This was a new departure, but the result was so successful as to warrant a repetition of the experiment in the future. Afternoon visits were made to the churches of St. Mary Abbots Kensington; St. Cuthbert Kensington, and Hammersmith; to All Saints, Fulham; to Chiswick Parish Church; to St. Albans; to Bow and Stepney; to Wennington; and to Aveley. A whole-day visit was made to Norwich, but owing to the distance very few members attended. Part IV. of Volume II. of the "Transactions" has been issued during the year, and the Council venture to say that it is a publication of which the Society may well be proud. Attention is drawn to the fact (as shown in the balance-sheet) that the illustrations have been largely due to special contributions. The thanks of the Society are due to those who have thus contributed, and to the Rev. E. S. Dewick for the excellent service he renders the Society as honorary editor. The balance-sheet, although showing a deficit of about 12*l.*, is regarded as satisfactory, the chief outlay being for the "Transactions," and as these are now published they will probably speedily repay their cost. Twenty-two new members have been elected during the year; the number on the register is now 274.

Liverpool Engineering Society.—The eighth ordinary meeting of the present session of this society was held on January 29 at the Royal Institution, Colquitt-street, Mr. Henry H. West, M.Inst.C.E., President, in the chair. After the usual business, Mr. Charles H. Yeaman, A.I.C.E., &c., read a paper entitled "Notes on Central Station Electric Lighting." In giving an account of several stations at present supplying current on a commercial basis, he described the West Brompton High Tension, Glasgow High Tension, Hastings, Eastbourne, and Brighton Stations, Crompton's Battery System used at Kensington Court, and King's Subdivided Battery System in use at Chelsea, and illustrated his descriptions by mounted prints and diagrams. The history of the stations was traced, and the changes in the various systems employed noted. The author then compared and discussed the methods adopted to generate, measure, and distribute the electric energy, with regard to their general advantages, and drew conclusions therefrom as to the system of supply which will probably become general. Complete sets of junction and distributing boxes and samples of the mains employed and in use at Liverpool were shown. Samples of Fowler's cables, as used by the House-to-House Company in London and at Eastbourne, were also exhibited. In concluding, the author gave a short account of what is required of an Electric Supply Company under law and by the public demand, with special reference to the Board of Trade rules and to the curves of supply obtained from the various stations alluded to. The discussion upon the paper was adjourned till Feb. 26.

Art Applied to Cast-iron.—This will be the subject of a paper to be read on Tuesday evening next, at the Society of Arts, by Mr. W. R. Lethaby. The chair will be taken by Mr. H H Statham.

The "Hercules" Street-cleansing Machine.—We witnessed some trials of this machine last Saturday at Westminster, but want of space compels us to hold over what we have to say about it until next week.

New York Cathedral Competition.—When the choice of four plans was made by the Building Committee, of which the Rev. Dr. Morgan Dix is chairman, out of the large number of designs submitted for the proposed Protestant Episcopal Cathedral of St. John the Divine, it was decided to return these to the architects for elaboration and further competition. These plans, from which the final choice of a design was to have been made, were submitted by William A. Potter, Heins & Lafarge, J. Halsey Woods, and George Martin Huss. February 1, 1890, was set as the date of the final competition. No decision is likely, however, to be reached at that time, and from present indications it appears altogether probable that no decided steps will be taken in that direction for a year or two to come. The property upon which it is proposed to erect the cathedral is included in the site selected for the World's Fair, and pending the determination as to whether the exposition is to be held in this city, the Building Committee has decided to defer positive action in respect to plans for the proposed structure. Both Mr. Potter and Mr. Lafarge said that nothing had been done by them in the way of elaborating the plans on the part of the architects, and that the entire matter was *in statu quo*. The Board of Trustees had taken no formal action, but the architects had been unofficially notified that the requirement as to February 1 would be waived. Mr. Lafarge added that the delay was likely to prove of benefit to all parties in interest. The working out of the details of an undertaking of the magnitude of the proposed cathedral required a great deal of care and thought, and the additional time would be appreciated by the architects.—*New York Times.*

The English Iron Trade.—The stability of the English iron market has been disturbed this week by a further fall in warrants, and as a consequence *bonâ fide* business has been greatly hindered, if not entirely checked. Makers of pig-iron are holding still firmly to their quotations, because of the large amount of work they have yet before them; but the decline of warrants has been persistent. The Glasgow warrant market has almost entirely collapsed under the pressure of heavy selling. Scotch makers' prices are in consequence easier, inferior brands having been reduced as much as 5s. and 7s. a ton. There has been some selling by weak holders of Cleveland pig as low as 52s., which is a reduction of 5s. a ton since last week, but makers generally are not being frightened by this sudden drop. As a consequence, very little business is being done in the North of England as well as in Lancashire and Staffordshire, and prices in the Midlands are hardly as strong as they were. Bessemer iron has also felt the pinch, but none of the makers in the North-west have as yet made any alteration in their rates. In sympathy with crude iron, finished iron and steel are easier in tone. As, however, manufacturers of the finished products are placed as favourably with regard to orders as producers of pig-iron, and seeing that high prices of fuel and a high rate of wages will not permit them to give way much, the markets for manufactured iron and steel are pretty stable. The orders at present received for new ships are few in number and of small importance; but both shipbuilders and engineers are still as busy as they can be, and as they will be for some time to come.—*Iron.*

Competition: The Hull Branch of the York Union Bank.—The *Eastern Morning News* says that at a meeting of the directors of the York Union Bank, Limited, held in York, the plans of Messrs. Smith and Brodrick, architects, of Hull, were selected from the designs submitted in a limited competition. The building will be stone, and in the Flemish Renaissance style, and will be erected at the corner of Lowgate and Bowlalley-lane. The ground floor will be occupied by the banking premises of the York Union Bank, above which will be commodious offices for letting purposes. It is proposed to commence the building forthwith.

Free Lectures at Carpenters' Hall.—The first of a series of free lectures on matters connected with building was delivered in the Carpenters' Hall, London-wall, on Wednesday evening last, by Mr. Banister Fletcher, F.R.I.B.A., Master of the Company, his subject being "Architecture of the World in all Ages," illustrated by large drawings, expressly prepared, and photographs. Sir John Lubbock, Bart., M.P., presided, and there was a large attendance. We hope to be able to give a report next week.

The American Production of Pig-iron.—The output of pig-iron in the United States in 1889, as we learn from the statistics promptly issued by the American Iron and Steel Association, amounted to 7,604,525 tons, against 6,489,738 tons in 1888, which shows an increase for last year of 1,114,787 tons, or over 17 per cent. As the American production of pig-iron in 1888 was the largest, up to that year, in the history of the American iron trade, the increase of over 1,000 000 tons in 1889 is remarkable. The question as to when the United States will surpass Great Britain in the output of crude iron is illustrated by some figures which are given in the returns. In 1882 Great Britain produced 8,586,680 tons, against 4,623,323 tons turned out by the United States. In 1883 the production was 8,529,300 and 4,595,510 tons, respectively; in 1884, 7,811,727 and 4,097,868 tons; in 1885, 7,415,469 and 4 044,526 tons; in 1886, 7,009,754 and 5,683,329 tons; in 1887, 7,559,518 and 6,417,148 tons; in 1888, 7,998,987 tons. For 1889 the production of pig-iron of Great Britain is estimated at 8,300,000 tons, while the output of the United States, of which we have actual figures, reaches 7,604,525 tons, a total slightly higher than the production of Great Britain in 1887.

Application of Photography to Meteorology.—The Council of the Royal Meteorological Society have arranged to hold, at 25, Great George-street, Westminster (by permission of the Council of the Institution of Civil Engineers), on March 18 to 21 next, an exhibition of instruments and photographs illustrating the application of photography to meteorology. The Committee will also be glad to show any new meteorological instruments or apparatus invented, or first constructed, since last March; as well as photographs and drawings possessing meteorological interest.

PRICES CURRENT OF MATERIALS.

TIMBER.	£.	s.	d.	£.	s.	d.
Greenheart, B.G. ....ton	7	0	0	7	15	0
Teak, E.I. ....load	12	0	0	14	0	0
Sequoia, U.S. ....foot cube	0	2	3	0	3	0
Ash, Canada....load	3	0	0	4	5	0
Birch ,, ...	3	0	0	4	15	0
Elm ,, ...	3	10	0	4	15	0
Fir, Dantsic, &c....	2	0	0	3	10	0
Oak ,, ...	2	10	0	4	10	0
Canada	5	10	0	7	0	0
Pine, Canada red	2	10	0	3	10	0
,, yellow	3	0	0	5	5	0
Lath, Dantsic....fathom	4	10	0	5	10	0
St. Petersburg	5	0	0	6	10	0
Wainscot, Riga, &c. ....log	0	0	0	0	0	0
Deals, Finland, 2nd and 1st. std. 100	8	10	0	11	0	0
,, ,, 4th and 3rd	7	0	0	8	0	0
Deals—Riga	7	0	0	9	0	0
St. Petersburg, 1st yellow	11	0	0	14	0	0
,, 2nd ,, ...	9	0	0	10	10	0
,, white	6	10	0	10	0	0
Swedish	7	10	0	16	0	0
White Sea	9	0	0	17	0	0
Canada, Pine, 1st	16	0	0	26	0	0
,, ,, 2nd	11	0	0	17	10	0
,, ,, 3rd, &c.	8	0	0	10	10	0
,, Spruce, 1st	9	0	0	11	0	0
,, ,, 3rd and 2nd ..	7	0	0	9	0	0
New Brunswick, &c.	6	0	0	8	10	0
Battens, all kinds	6	0	0	17	0	0
Flooring Boards, sq., 1 in., prepared, First	0	11	0	0	14	0
Second	0	8	0	0	10	6
Other qualities	0	6	0	0	7	0
Cedar, Cuba ....foot	0	0	4	0	0	5
Honduras, &c.	0	0	4	0	0	4½
Mahogany, Cuba	0	0	5	0	0	6
St. Domingo, cargo average ..	0	0	5	0	0	6½
Mexican, cargo average	0	0	4½	0	0	5½
Tobasco ,, ...	0	0	5½	0	0	6½
Honduras ,, ...	0	0	5½	0	0	9½
Box, Turkey ....ton	4	0	0	13	0	0
Rose, Rio	15	0	0	20	0	0
Bahia	14	0	0	18	0	0
Satin, St. Domingo....foot	0	0	9	0	1	3
Porto Rico	0	0	10	0	1	6
Walnut, Italian	0	0	4½	0	0	6½
IRON— METALS.						
Bar, Welsh, in London ....ton	0	0	0	0	0	0
,, Staffordshire, in London..	8	10	0	9	10	0
COPPER—British, cake and ingot	56	0	0	0	0	0
Best selected	57	0	0	57	10	0
Sheets, strong	64	0	0	65	0	0
Chili, bars	48	15	0	49	0	0
YELLOW METAL....lb.	0	0	5½	0	0	6
LEAD—Pig, Spanish ....ton	12	17	6	0	0	0
Sheet, English	15	5	0	0	0	0
Pipe	15	15	0	0	0	0
TIN—Straits	94	0	0	0	0	0
Australian	94	0	0	0	0	0
English Ingots	99	0	0	0	0	0
OILS.						
Linseed ....ton	20	17	6	21	2	6
Cocoanut, Cochin	26	0	0	26	10	0
Ceylon	23	10	0	0	0	0
Palm, Lagos	24	0	0	24	10	0
Rapeseed, English pale	32	10	0	32	15	0
,, brown	31	0	0	31	5	0
Cottonseed, refined	21	10	0	22	0	0
Tallow and Oleine	21	0	0	40	0	0
Lubricating, U.S.	5	10	0	6	10	0
,, refined	7	0	0	12	0	0
TAR—Stockholm....barrel	1	5	6	0	0	0
Archangel....	0	17	0	0	0	0

CONTRACTS & PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Making-up Roads, &c.	Willesden Local Board	O. Claude Robson	Feb. 11th	ii.
Sewer and other Works	do.	do.	do.	ii.
Works and Materials	Hammersmith Vestry	H. Mair	Feb. 12th	ii.
Goods Shed and Offices, Basingstoke	G. W. R. Co.	*Official*	do.	i.
Electric Lighting	Hackney Union	W. Barnett	do.	xii.
Brick Sewer	Clerkenwell Vestry	W. Iron	Feb 13th	xii.
Barging away Slop, Rubbish, &c.	Lambeth Vestry	*Official*	do.	xii.
Works and Materials	do.	do.	do.	xii.
Paviors' and Masons' Work	Limehouse Bd. of Wks	do.	Feb. 17th	ii.
Supply of slop Waggons	St Mary (Islington) Vestry	do.	do.	xii.
Works and Materials	St. Pancras Vestry	W. B. Scott	do.	xii.
Drainage Works	Finchley Local Board	*Official*	do.	xii.
Galvanised Iron Dust Pails	Rotherhithe Vestry	do.	Feb. 19th	xii.
Removal of Dust and Ashes	Chelsea Vestry	do.	do.	xii.
Sewerage Works, Heswall	Wirral U. R. S. A.	C. H. Beloe	do.	i.
Works and Materials	St. Marylebone Vestry	*Official*	Feb. 20th	xii.
Broken Stone, Footway Kerb, &c.	do.	do.	do.	xii.
Sewerage Works	Epping R.S.A.	E. Egan	do.	xii.
Making-up Roads	Friern Barnet Loc. Bd.	G. Clarke	Feb. 21st	xii.
Laying Tar Concrete	Portsmouth U.S.A.	*Official*	Feb. 24th	ii.
Completion of Portion of Aqueduct (Wtrks.)	Manchester Corporatn.	G. H. Hill	do.	ii.
Works and Materials	St. Mary (Islington) Vestry	*Official*	Feb. 25th	xii.
Rolls Office, Douglas (Isle of Man)	The Committee	do.	Mar. 1st	ii.
Chapel and Schools, Bournemouth (West)	.....	Jas. Cubitt	Not stated.	xii.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
Roads Foreman	Cheshunt Local Board	2*l.* weekly	Feb. 11th	xvi.
Clerk of Works	do.	do.	do.	xvi.
Road Surveyors	Norfolk County	2*l.* per week each	Feb. 12th	xvi.
Inspector of Nuisances	Carlisle Corporation	125*l.*	Feb. 13th	xvii.
Clerk of Works	Fulham Vestry	2*l.* 5*s.* per week	do.	xvi.
Sanitary Inspectors (3)	Lambeth Vestry	120*l.* each	Feb. 26th	xvi.

TENDERS.

[Communications for insertion under this heading must reach us *not later than* 12 *noon on Thursdays.*]

AMBLE (Northumberland).—For the erection of Wesleyan Chapel, Schools, and Minister's house. Mr. G. Reavell, jun., architect, Alnwick. Quantities by Mr. G. Connell, 42, Grainger-street, Newcastle-on-Tyne:—

Accepted (lowest) tenders.

R. Carse & Son, Amble, Acklington, Masons	£1,240 0 0
D. M. Spence, Amble, Joiner, Painter and Glazier, Plumber and Smith	950 0 0
Philip Wood, Amble, Slater	86 0 0
J. H. Lyall, Plasterer	98 5 0

ASHFORD (Kent).—For erecting a house, Christ Church-road, Ashford. Mr. H. Jeffery, architect:—

Clark, Lenham	£598 12 6
Hughes, Ashford	565 0 0
Day, Ashford	527 0 0
Howland, Ashford	523 0 0
Petts, Folkestone	510 0 0
Baker, Ashford	497 14 0
Slade, Maidstone	485 0 0
Joy, E., Ashford (accepted)	485 0 0
Dowle, Ashford	374 16 8

BRISTOL.—For erecting the Barley Fields Board Schools, Bristol. Mr. F. B. Bond, architect, Bristol:—

J. E. Davis	£9,432 0 0
Wm. Church	9,318 0 0
Stephens & Bastow	9,199 0 0
E. T. Hatherley	9,060 0 0
A. J. Beaven	9,000 0 0
W. H. Cowlin & Son	8,888 0 0
James Wilkins	8,880 0 0
T. R. Lewis	8,862 0 0
R. Wilkins & Sons	8,675 0 0
John Perrott	8,588 0 0
H. J. Rossiter (accepted)	7,750 0 0

CROYDON.—For alterations at Hillside, Duppas Hill, Croydon, for Mr. John Jaques. Mr. W. H. Woodroffe, architect, 214, Great Dover-street, S.E.:—

Young & Lonsdale	£217 0 0
Smith & Son	209 0 0
Page	196 0 0

HALIFAX.—Accepted for the erection of two houses, Gransmere-place, on the Heath Hall estate. Mr. T. L. Patchett, architect, Halifax:—

Craven Robinson, excavator, mason, and bricklayer's work (without boundary walls)	£398 0 0
W. G. Hey, carpenter and joiner's work	209 1 6
Herbert Walsh, plumber and glazier's work	80 0 0
John Firth, slater and plasterer's work	87 0 0

[All of Halifax.]

[Gates and railings, fixtures and fittings, not included.]

HORSHAM.—For erecting residence:—

N. Lidstone, Finsbury Park (accepted)	£2,768 0 0

LONDON.—For erecting the new Jubilee Wing of the Children's Hospital, Great Ormond-street. Mr. Charles Barry, architect:—

Wagstaff & Son	£16,287 0 0
Nightingale	15,555 0 0
Higgs & Hill	15,360 0 0
Perry & Co	15,199 0 0
Colls & Son	15,050 0 0
Foster & Dickson	14,955 0 0
Peto Bros.	14,768 0 0
Mitchell	14,493 0 0

LEYTONSTONE.—For alterations and additions to the Board-room and Offices, and new Out-Relief Office, at the Union Workhouse, Leytonstone, Essex, for the West Ham Board of Guardians. Mr. Francis J. Sturdy, architect, 44, Finsbury-pavement, E.C.:—

Norton & Co., Stratford	£5,888 0 0
A. Reed, Stratford	5,720 0 0
C. Cox, Hackney	5,590 0 0
S. J. Jerrard, Lewisham	5,489 0 0
J. A. Reed, Walthamstow	5,469 0 0
H. S. Marten, Plaistow	5,462 0 0
W. Downs, Walworth-road	5,353 0 0
C. J. Sherwood, Leytonstone	5,346 0 0
Bishop & Webb, Stratford	5,335 0 0
North Bros., Stratford	5,295 0 0
J. Morter, Stratford	5,187 0 0
W. Gladding, Whitechapel	4,982 0 0
W. Gregar, Stratford	4,973 0 0
Calnan & Co., Commercial-road	4,896 0 0

LONDON.—For the erection of new headquarters for the 17th (North Middlesex) Rifle Volunteers, High-street, Camden-town, for the Committee. Messrs. Spalding & Cross, architects:—

Van Bros.	£7,906 0 0
Seward	7,120 0 0
Higgs & Hill	6,800 0 0
Perkins	6,637 0 0
Bywaters	6,335 0 0
Perry & Co.	6,198 0 0
Nightingale	6,197 0 0
Low & Sons	6,145 0 0
Holloway Bros.	6,100 0 0
Wall	6,087 0 0
Chappell	6,046 0 0
Toms	6,019 0 0
Peto	5,987 0 0
Sheppard	5,934 0 0
Guild & Brand	5,798 0 0
Scrivener	5,773 0 0
Lawrance & Sons	5,645 0 0

[This list was received too late for insertion last week.]

LONDON.—For rebuilding Bacon's Schools, Grange-road, Bermondsey. Mr. J. Gale, architect. Quantities by Messrs. D. Campbell & Son:—

Charteris	£3,753 0 0
F. & H. F. Higgs	3,750 0 0
Jas. Greenwood	3,700 0 0
Rider	3,686 0 0
Shepherd	3,650 0 0
W. Downs	3,588 0 0
S. Jerrard	3,427 0 0
Jno. Greenwood	3,333 0 0

LONDON.—For pulling-down and rebuilding house and shop at Castlenau, Barnes, for Mr. W. Mannering. Mr. T. Mullett Ellis, architect, Essex-street, Strand:—

Brickell	£1,090 0 0
D. & J. Prince	1,025 0 0
Wicks	986 0 0
Grant	950 0 0
Francis Carter	943 0 0
A. Hunt	940 0 0
Scharien & Co.	898 0 0
Haywood	827 0 0

LONDON.—For alterations at No. 1, Church-terrace, Castlenau, Barnes, for Mr. T. E. Mannering. T. Mullett Ellis, architect, 28, Essex-street, Strand:—

Prince	£108 0 0
H. G. Haywood, Bridge-road, Hammersmith (accepted)	105 0 0

LONDON.—For certain alterations, painting, and decorating, for new dining-room at the "Criterion" Restaurant, Piccadilly, for Messrs. Spiers & Pond:—

B. E. Nightingale (accepted)	£200 0 0

LONDON.—For the removal of filth at Barking outfall works for the London County Council:—

C. Abbott & Sons, Hertford-road, Kingsland	£820 0 0
L. Knight, 79, Chestnut-avenue, Forest-gate	700 0 0
M. H. Abbott & Co., Mornington-road, Leytonstone	655 0 0
J. J. Prior, Stonebridge Wharf, Limehouse*	505 0 0

* Accepted for six months, with power to the Council then to determine the engagement or to continue the contract for the whole period of twelve months.

LONDON.—For altering, adapting, and painting the University Hall, Gordon-square, for the trustees of the late Dr. Daniel Williams. Mr. T. Chatfeild Clarke, architect, 63, Bishopsgate-street, E.C. Quantities by Messrs. Leonard & Clarke, 202, Bishopsgate-street, E.C.:—

Colls & Sons	£3,027 0 0
Hall, Beddall, & Co.	2,972 0 0
Rider & Son	2,888 0 0
Holland & Hannen	2,698 0 0
Titmas & Sons	2,690 0 0
Adamson & Son	2,487 0 0
Nightingale (accepted)	2,305 0 0

[This list was received too late for insertion last week.]

LONDON.—For rebuilding No. 80, Tottenham-court-road, for Mr. Frank Moss. Messrs. Edmeston & Gabriel, architects, 42, Old Broad-street, E.C. Quantities supplied by Mr. G. R. Tasker, 38, John-street, Bedford-row, W.C.:—

		A*
Patman & Fotheringham	£1,823	£30
J. T. Chappell	1,676	28
Bywaters	1,656	27
Lawrance & Sons	1,650	35
Scott	1,623	28
Young & Lonsdale	1,616	39
Scrivener & Co.	1,600	36
Ansell	1,596	31
Smith & Son	1,587	25

* Deduct if shop-front in deal.

LONDON.—For workshops in Printing House-yard, Hackney-road, for Mr. A. T. Roberts. Mr. Ebenezer Gregg, architect, 1, St. Helen's-place:—

Ashby & Horner	£1,822 0 0
Downs	1,725 0 0
Williams & Son	1,690 0 0
Hall, Beddall & Co.	1,548 0 0
Shepherd	1,500 0 0
Brown & Harris (accepted)	1,430 0 0

LONDON.—For alterations at the "Ranelagh Arms," Roman-road, Old Ford, E. Mr. R. A. Lewcock, architect, 88, Bishopsgate-street Within, E.C.:—

F. G. Higgs	£1,297 0 0
Allen & Sons	1,250 0 0
J. Ivory	1,219 0 0
Spencer & Co.	1,185 0 0
Todd	1,169 0 0
S. Goodall	998 0 0
A. Hood	950 0 0
Gasfittings.	
Steadman	102 0 0

LONDON.—For alterations to shop front, &c., at No. 85, Brompton-road, S.W. Mr. Morewood, architect. No quantities:—

E. Colls	£250 0 0
Langdale & Hallett	236 0 0
Craske	226 0 0
C. Wall	213 0 0
Stimpson & Co.	197 0 0
Drew & Cadman (accepted)	196 0 0

LONDON.—For alterations, &c., at "The Manor House," Finsbury Park, for Mr. J. Swinyard. Mr. John E. Pinder, architect and surveyor, Bridge House, South Tottenham:—

S. Yardley & Sons	£1,975 0 0
Wilkinson Bros.	1,946 0 0
Hy. Knight & Son	1,897 0 0
Mattock Bros.	1,850 0 0
G. E. Todd	1,729 0 0
S. Goodall	1,547 0 0
John Beale (accepted)	1,500 0 0

LONDON.—For additions to the "Brewery Tap," Stean-street, Haggerston, for Messrs. Daniell & Sons' Breweries, Limited. Mr. J. W. Start, surveyor, Cups Chambers, Colchester:—

Chessham & Son, Haggerston	£125 0 0
B. Smith, Downham-road (accepted)	105 0 0

LONDON.—For further additions at 29, Red Cross-street, E.C., for Messrs. Capua & Co. Messrs. Edmeston & Gabriel, architects, 42, Old Broad-street, E.C.:—

Young & Lonsdale (accepted)	£505 0 0

LONG EATON.—For works for water supply, for the Long Eaton Local Board. Mr. Geo. Hodson, M.Inst.C.E., engineer, Loughborough:—

	Sec. I.*	Sec. II.†	Total.
Chas. Green, Rotherham	£6,107 0 0	£36,800 7 1	£42,907 7 1
S. & E. Bentley, Leicester	2,910 0 0	34,740 0 0	37,650 0 0
J. Tomlinson, Derby	3,485 0 0	32,965 0 0	36,450 0 0
Holme & King, Liverpool	2,734 17 4	33,510 16 7	36,245 13 11
Wm. Jenkins, Leamington	2,656 10 0	33,519 10 0	36,176 0 0
H. Vickers, Nottingham	2,800 0 0	32,600 0 0	35,400 0 0
H. Fotherby & Son, Burnley	2,236 0 10	32,879 7 8	35,115 8 6
H. Shardlow, Nottingham	1,963 0 0	32,337 0 0	34,300 0 0
J. F. Price, Nottingham	2,463 0 0	31,131 0 0	33,594 0 0

* For sinking well and driving headings to obtain a supply of 1,400,000 gallons per day.

† For erecting engine and boiler house, pumping machinery, engineer's cottage, constructing covered reservoir, and providing and laying all mains and apparatus.

[Engineer's estimate, £35,701.]